AMERICAN
DYESTUFF REPORTER

VOLUME XXIV APRIL 22, 1935 NUMBER 8

Dyeing and Finishing

Machinery for Knit Goods

By BLISS M. JONES

DYEING and finishing knit goods from a mechanical standpoint has problems quite different from dyeing and finishing in general. Due to the nature of knit material, it is easily stretched and distorted out of shape. The lighter silk materials, of which silk hosiery is an example, need even more care and can not stand any crude or rough processing. With these facts in mind, machines have been developed which from a mechanical point of view, are probably the most advanced of any machines used for dyeing or finishing in the entire textile industry.

It is the purpose of this article to give a brief outline and description of the machines that have been developed for the dyeing and finishing of knit goods. Though machines of certain manufacturers are taken as examples and described, it is by no means to be assumed that they are the only ones making the same or similar machines. On the contrary, in many cases similar machines are made by other manufacturers, and in some instances their products may be better for particular purposes.

HISTORICAL

The first dyeing was done in crude wooden vats heated by open steam pipes and poled by hand. Results were uneven, labor costs were high and damaged material was common. The "Tom Tom" machine, a vat equipped with mechanically driven wooden hammers, was some improvement but it was not until the tub was equipped with paddles which propelled the goods through the dye liquor that the modern dyeing machine was started. This latter machine made use of the same principle that is used in the paddle machine of today. At about this same time the first rotary machine was devised. This consisted of a perforated cylinder which turned within a wooden tank. Rotary machines then began to come to the fore. Experiments were made on lining the machines with metal or building the entire machine of metal. At that time the metals most readily available were sheet iron, copper and tin. It can readily be seen that even these machines were not all that was to be desired. They were attacked by certain chemicals, changed the shade of certain dyestuffs and were difficult to clean. The best work still had to be done by dyeing in the skein before knitting.

It was not until 1905, when Monel metal was developed that the dyeing of knit goods came into its own. This metal has become so well known and so extensively used that there is no need of detailing its properties here. Suffice it to say, that the first Monel metal rotary dyeing machine was made in 1907 and is still in use. Machinery manufacturers recognized the superiority and adaptability of this metal but its development was retarded because of the high cost. However, today the Monel metal rotary machine is accepted as a standard, and is used probably more than any other machine for dyeing knit goods, particularly hosiery.

PADDLE DYEING MACHINE

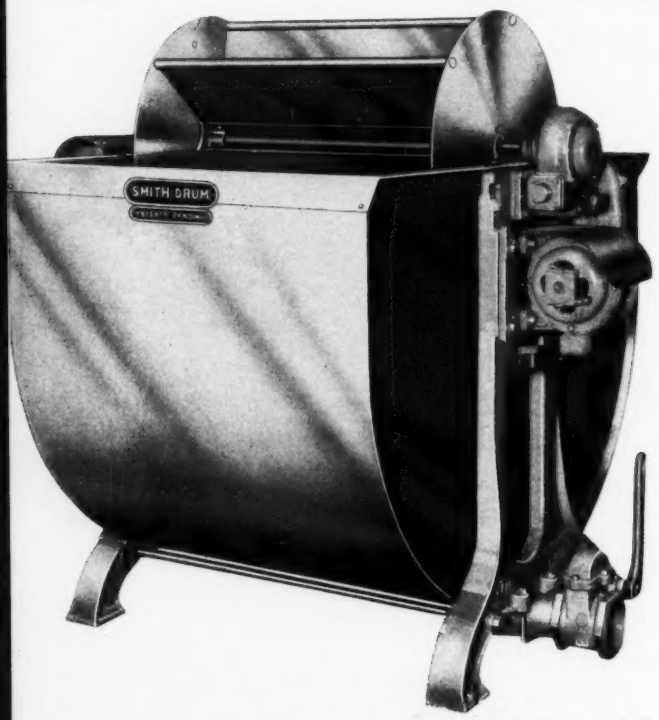
The paddle type dyeing machine is the oldest and simplest machine used for the dyeing of hosiery. Coarser materials are put in the machine loose, but the finer grades of silk hosiery must be dyed in nets which not only protect the goods, but serve to separate lots in dyeing.

The older wood, or metal lined paddle machines are fast being replaced by all Monel metal machines.

In the modern machine the tank is all welded construction. Steam pipes for heating the liquor are placed in the bottom of the tank. They are covered by a perforated false bottom to protect the goods. Paddles vary on different machines but are all designed to give a lively flow of liquor with the least possible roughing of the goods.

ROTARY DYEING MACHINES

The two machines illustrated show the most modern type of rotary dyeing machines. They are as far advanced from the first one made in 1907 as a 1935 automobile is advanced from a 1907 Model. The latest machines are all Monel metal, which eliminates any contamination of the dye liquor and insures longer life of the machine, for with but very few exceptions it is not affected by chemicals.



Courtesy Smith, Drum & Co.

Fig. 1—Modern Paddle Dyeing Machine

Courtesy Smith, Drum & Co.

Fig. 2—Smith, Drum Rotary Machine

For dyeing, boiling-off and bleaching of any type of hosiery this type of machine is supreme. The inside of the cylinder, in fact every nook and corner, has been designed to give an absolutely smooth surface which can not harm even the finest of pure silk chiffons.

The structural advancements are too many to go into in detail. One that deserves mention, however, is the welded cylinder construction. This adds strength, makes the cylinder more rigid and leaves no rivets to come loose.

The Rochester machine makes use of the "long bath" principle. In other words, the ratio of dye liquor to the load in the machine is very high. This is said to insure even penetration. This machine is also equipped with baffle plates on the outer tub or casing which prevent the dye liquor from following the travel of the rotating cylinder, and instead, force it through the goods in the cylinder.

All modern rotary machines are made in various capacities and with different numbers of compartments. Tubs are equipped with an overflow to allow scum and dirt floating on the surface to be drawn off. Steam for heating is admitted by different methods, but always so that uniform heating is secured throughout the machine. A method of quickly draining the tank is provided. There is a spigot for drawing off a sample of dye liquor for testing. Some form of apron is used to bridge the gap between the tub and cylinder while loading or unloading and prevent the danger of goods falling into the tub. Reversing action has been improved in the best machines, so as to eliminate as much shock and jar as possible and thus stop the abuse that the drive members, cylinder and the entire machine might be subject to.

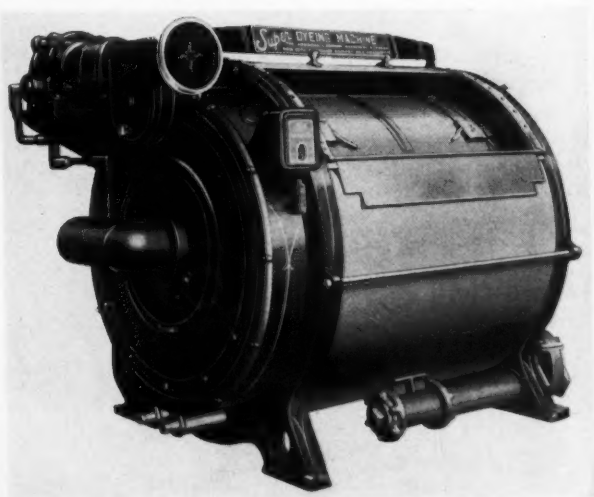
All in all, a modern rotary machine is an up to the minute, efficient and lasting piece of equipment.

DYEING MACHINES FOR PIECE GOODS

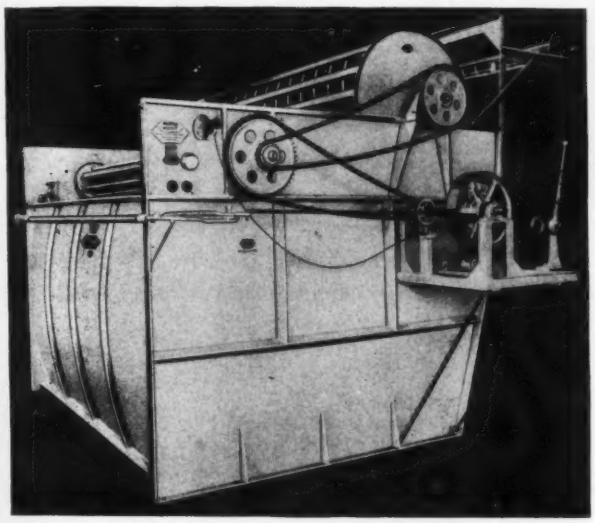
All dyeing equipment for knit piece goods has advanced greatly. Rodney Hunt's new machines illustrate this as well as any. These machines are made of a stain-

Fig. 3—Rochester Rotary Machine

Courtesy Rochester Eng. & Centrifugal Corp.



less metal and the patented welded construction of thin metal allows for special designs to meet special problems. The importance of minimum cost has been considered in adapting these stainless metals to the industry. Heavy bracing of iron or steel is eliminated. The kettles have a natural bulge, and light-weight stainless braces prevent the collapse of the bulge when the liquor in the tank is removed. This construction is said to be so strong that practically all vibration is removed, even under heavy boiling and load conditions.



Courtesy Rodney-Hunt Machine Co.

Fig. 4—New Design Thin Metal Welded Construction Dyeing Machine

A tub so constructed provides liberal strength for the support of end bearings, for carrying reel, rolls, countershaft, etc. To the user, the thin metal construction is particularly interesting because of its relatively low cost.

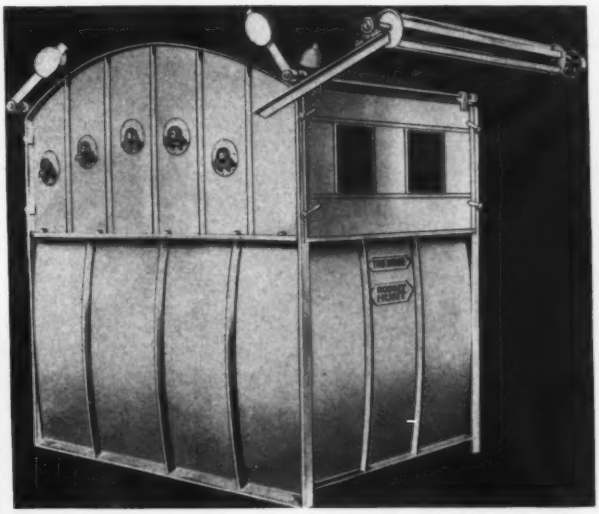
Due to the insolubility of the stainless metals used, and freedom from attack, it is possible to change color between batches by a simple fifteen minute rinse. Changes from Canary Yellow to Navy Blues are not unusual. Perfect matchings, elimination of redyes and superior finishes are said to be the advantages of stainless metal equipment.

The same general type of machine is adapted for washing and bleaching machines. Special features which have been taken into consideration are; variable speed, special skimming attachments, special heating and water control piping, as well as complete enclosure with windows, cleaners and inside electric lights.

For some types of work, the carrier roll kettle has advantages over the usual reel and front roll. The interesting feature of the kettle illustrated is that it is completely sealed to prevent the escape of steam or liquors.

CENTRIFUGALS OR EXTRACTORS

In discussing finishing machinery, extractors must be mentioned. While the fundamental principle of operation has not changed, there have been great improvements in the efficiency of these machines; both the over driven and the under driven.



Courtesy Rodney-Hunt Machine Co.

Fig. 5—Completely Sealed Rodney-Hunt Carrier Roll Stainless Steel Dye Kettle

Monel metal basket construction is practically standard. Brakes have been improved. Safety covers have been provided which are impossible to open until the machine stops and the machines can not start until the cover is closed.

Courtesy Rochester Eng. & Centrifugal Corp.

Fig. 6—Rochester Underdriven Extractor

Underdriven centrifugals of the suspended unit type (see illustration) are furnished in either direct or belt drive. They have their tubs or cases suspended by means of heavy wire cable which eliminates vibration due to "out of balance" loads.

DYEING CONTROL APPARATUS

Dyeing control apparatus consists principally of automatic time-temperature controls. There are variations in installations; some being complete on a machine and others having a remote control. On the latter type installation, the controllers are mounted on a panel in the boss dyer's office, and a signalling panel is located in the dyeroom where the lights may be easily seen by the op-

Courtesy Foxboro Co.

Fig. 7—Foxboro Company's Installation of Automatic Temperature Controllers in a Hosiery Dyehouse

erators. Without going into detail, it is enough to say that the boss dyer has a complete check on all machines, and the lights indicate to the operator exactly when to carry out all operations.

Dyers know that the best production is obtained only when the correct method of operation is closely followed. One of the most important factors is the rate at which heat is applied and the time during which boiling is carried on. It is impracticable and almost impossible to control these time and temperature factors by the human element. An automatic controlling device does it mechanically and results can always be duplicated.

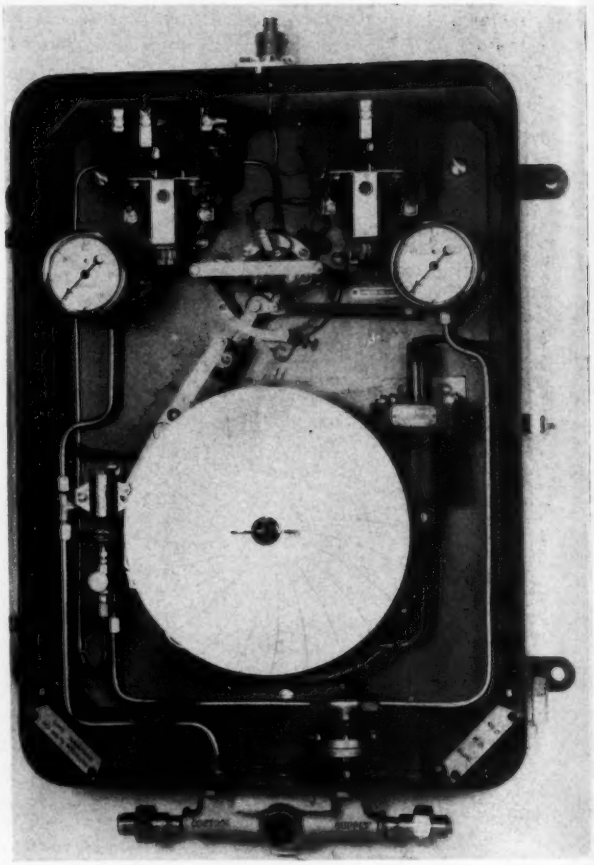
Without time devices the boiling periods may be continued much longer than there is any necessity for. Also much time is lost between the boiling period and the "add dye", because the operator is not definitely informed that the desired temperature has been reached, and he consequently waits until he is sure it has gone low enough.

Fuel savings are said to be appreciable with time-temperature devices and these savings are greatest during the boiling period. With hand control it is easy enough to maintain a temperature of 212 degrees by admitting enough steam to cause boiling. However, invariably more than enough is added without raising the temperature and merely wasting the extra heat units. The automatic control is so sensitive that it may be set only a fraction of a degree below the boiling point and still not permit actual boiling. It is quite obvious that considerable saving of fuel is accomplished. The automatic control also prevents the cooling operation from continuing below a certain point. Under hand control this cooling might be continued to a point considerably below 160 degrees or whatever the predetermined point might be, and dropping the temperature below this point only means that additional heat units will have to be supplied to bring the temperature up during the next heating period.

MACHINES FOR FINISHING KNIT PIECE GOODS

Two rather new patented machines have come into extensive use for the finishing of tubular knit goods. Each is different in principle from the other, and each has certain advantages. One is the Modern Dome machine made by the Kasanof Tubular Machines Inc., the other is the Tube-Tex machine for which H. W. Butterworth & Sons Co. is the licensed manufacturer.

In the Dome Process, live steam is fed through a large copper dome which conditions the steam. The steam is ejected from apertures around the dome and forced through the fabric, as it is drawn up over the dome. Immediately afterwards the cloth comes in contact with the hot dome which sets the fabric at the desired width.



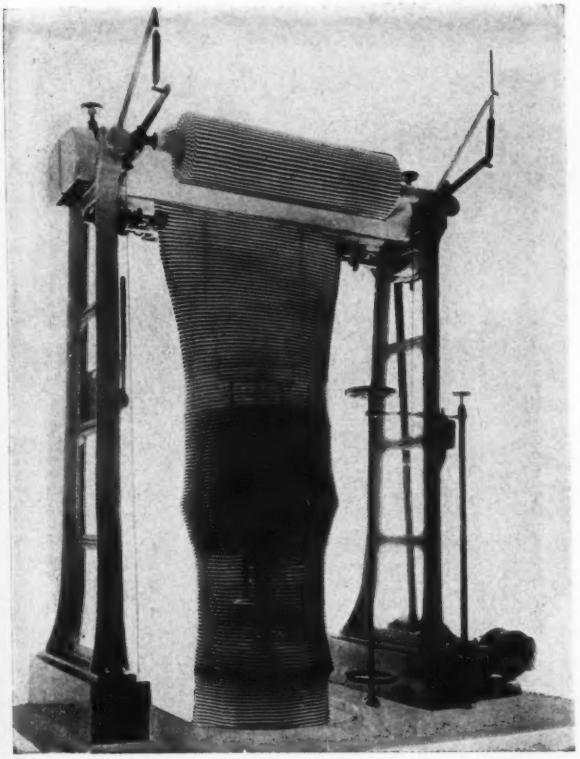
Courtesy Bristol Co.

Fig. 8—Inside View of Bristol Company's Time Temperature Controller

The Dome Process dries, steams and also tenters in one operation; and while the operation is going on the goods may be inspected. The actual time for operations is said to be less than half that required for drying alone on upright dryers. The fabric may be dried only without steaming when desired.

It is claimed that the circular dome exerts the same tension on all parts of the goods as it is being steamed, thus eliminating distortion of design and pattern and allowing stripes and blocks to be finished square without bowing. Also goods are kept uniform in width throughout the piece. Material may be stretched when desired in length or spread in width, or stretched and spread at the same time. If preferred, the original size may be retained.

Drying in the Dome Process compensates for lengthwise tension by drying the fabric in such a way that it avoids pulling and stretching. It allows the cloth to resume its natural state.



Courtesy Kasanof Tubular Machines, Inc.

Fig. 9—Kasanof Machine in Operation

The machine takes about six square feet of floor space. It is said to be economical, efficient, durable and may be run continuously.

In the Tube-Tex machine the wet fabric first passes over a driven spreader which makes the cloth flat. Then it is extracted by squeeze rolls. Next it receives chemical treatment and enters the dryer in flat form. After drying it is conditioned and folded. All this is one operation in one machine and operated by one man. This finisher is claimed to lower cost, save labor, power, space and waste.

Advantages of the squeeze roll extracting are said to be: uniform extraction, elimination of extractor marks and distortion caused by not drying in the flat form, control of tension in width and length assuring any yield desired, more uniform finished width, and tension control for either stretching or preshrinking.

The advantages given for the drying and conditioning unit are: control of moisture regain, uniformly dried and conditioned fabric, better hand and dyeing because of low temperature drying, elimination of bar marks and distortion, and more stable dimensions because of proper moisture content.

The chemical treatment received may be delustering, softening, lusterizing, filling, waterproofing, sizing, or conditioning by the application of hygroscopic materials.

HOSIERY FINISHING MACHINES

Since the day of the drybox and wooden forms, the hosiery finishing department has had a revolutionary change.

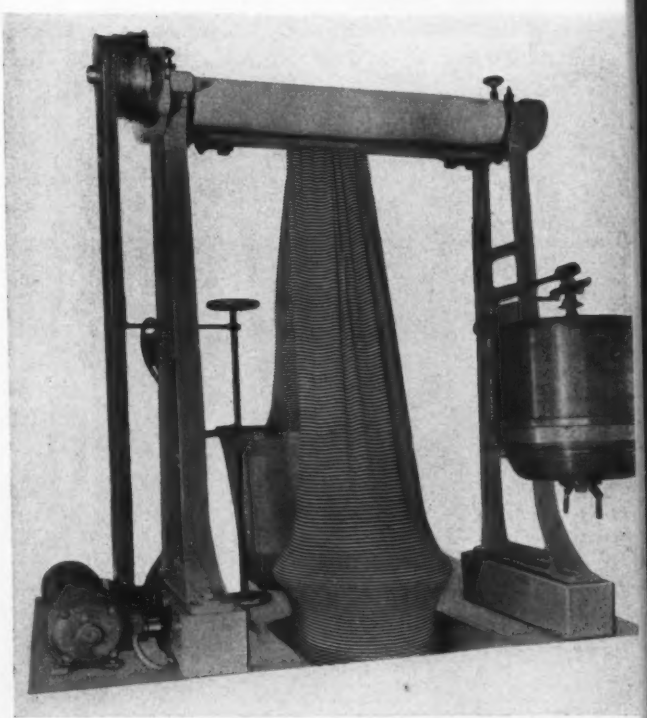
The present day apparatus is a model of efficiency. The regular forms are now mounted in series on stationary tables. They are aluminum and internally heated by steam. Speed of operation and labor saving are two features. The improvements in construction and ease of operation are too many to be gone into in detail.

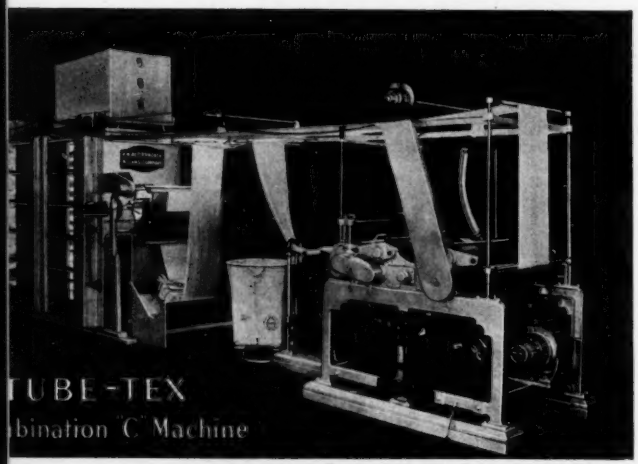
The machine illustrated is the Dual Heat machine made by Paramount Textile Machine Co. It illustrates the latest type of machine. When service wear was demanded on chiffon hose it brought up a new problem in drying. The light part would dry too fast, become glazed and have board marks before the seam and reinforced part had become dry. This new machine has a patented form which dries the sheerer portions of the fabric at a suitable low temperature, and the reinforced parts at a suitably higher temperature. The forms are made of stainless metal with a perfectly smooth surface to prevent "pulled threads."

East of operation is taken care of by having the forms automatically selected and timed. The operator remains in one position and by pressure of the hand on a conveniently located control, instantly puts the machine into or out of action. When in boarding-stripping position the forms are tilted at a convenient angle so that the operator need not stretch during the

Fig. 10—Drying Fabric on Dome Machines

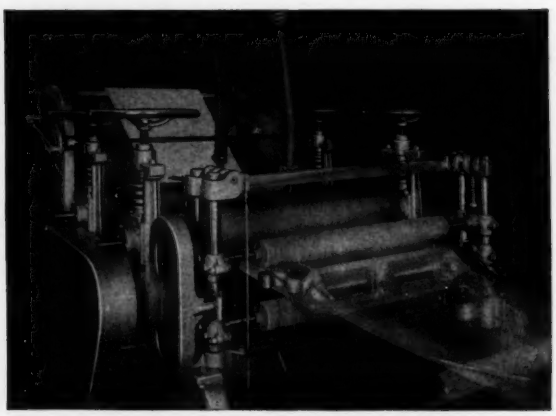
Courtesy Kasanof Tubular Machines, Inc.





Courtesy H. W. Butterworth & Sons Co.

Fig. 11—Complete Tube Tex Machine



Courtesy H. W. Butterworth & Sons Co.

Fig. 12—Double Extractor and Processor Showing Phantom View of Fabric Passing over the Driven Spreader

Courtesy Paramount Textile Machine Co.

Fig. 13—Dual Heat Machine

operation, thereby decreasing fatigue and facilitating production. Three stockings are stripped in one operation. Production averages about ten dozen stockings per hour.

WATER TREATMENT

The textile industry requires large quantities of clear, absolutely soft water for cleansing, dyeing and finishing materials.

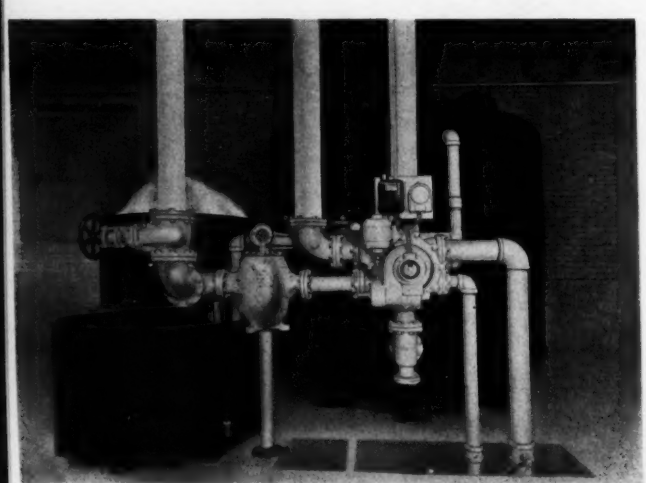
Whenever water comes in contact with soap it is essential that the water be free from hardness in order to avoid the formation of insoluble soap curds, which prevent satisfactory results in this as well as in subsequent operations, besides causing a considerable waste of scouring materials.

When dyeing is done in a neutral or alkaline bath precipitation of hardness is favored. Furthermore, many dyestuffs that are used react directly with the salts of calcium and magnesium and in such cases streaks and blotches in the finished material are common.

In managing any dyeing and finishing establishment these facts must be considered. The solution, of course, is to have some sort of water purification and softening treatment. The zeolite softener, such as is illustrated, is a good example of an efficient means of combating hardness. The modern softeners are comparatively small, efficient and save much trouble that would come from untreated water.

Fig. 14—Installation fo a Permutit Softener in a Knit Goods Plant

Courtesy Permutit Co.



A Controversy Over

Hosiery Dyeing

By **NOEL D. WHITE**

A DISCUSSION THAT DRAWS A CHALLENGE

SOMETIME ago the chairman of our section of the A.A.T.C.C. asked the writer to prepare a short paper, to be read at a future meeting, explaining the different ways in which hosiery was being dyed. The idea was to bring a discussion of the several methods before the members of the section and get the views of the adherent of each method for the benefit of all. The writer being known to have adapted the most radical, and in the mind of many, the most hazardous method was selected to open the discussion on the subject.

Accordingly the writer went to work and in order to make the initial opening specific and to the point quoted some of the remarks that had come to his ears in regards to his way of dyeing silk hosiery. One had said that he had gone extremely too far in order to save dyestuffs and run the risk of having streaky and uneven hosiery. This man being a dyestuff salesman of course had a good reason to criticize the use of acid in the dyebath and his criticism was discounted. Some dyers criticized that method saying they could not possibly see how it could be done and have the goods free from the soap and oil spots that would naturally result when acid was added to a dyebath to dye hosiery coming from a de-gumming bath. Their contention was that a boiled off lot could not possibly be rinsed thoroughly free from the degumming agents and consequently the remnants would break down and curdle in the dyebath as soon as the acid was entered.

These dyers had never seen dyeing silk in a broken boil-off bath where acid is poured right into the soap bath and the dyeing done in it. At any rate the paper caused a lively discussion during the evening. The author of the paper was well qualified and prepared to answer any question in regard to it and the meeting was regarded a successful as well as an educative one.

The echo of that meeting reverberated and created a disturbance in our heretofore peaceful atmosphere. Someone who took exception to what was read in that paper and subsequently published in the AMERICAN DYESTUFF REPORTER wrote a scathing letter in reprisal to the author, denying some of the things he had read in the REPORTER and had recognized to be attributed to him, even though no names had been mentioned at any time during the discussion, nor in the REPORTER.

DEFYING AN AUTHORITY

This man was recognized as being an authority on full fashioned hosiery knitting, because he superintended one of the first hosiery mills opened in this part of the country. Being highly regarded as such wherever a new hosiery mill was started his opinion was eagerly sought. When the mill where I was engaged started knitting full fashioned hosiery he was invited to come and visit our new set up. He was told his criticism would be appreciated. He came, saw and criticized. When introduced in the dyehouse he criticized the way our dyeing was done. He said we would get better, quicker, cheaper and more satisfactory results by dyeing in the de-gumming bath like he was doing.

His remarks were listened to reverently and kindly considered, first, because when we started dyeing hosiery we had no guidance nor advice except the knowledge and experience of many years of dyeing other materials. Our dyeing here had been guided by judgment. Any suggestion to better the work would naturally be carefully considered. Second, any criticism coming from such an authority would be welcome if constructive in any way, and finally I had never in my life thought that my work was above criticism. Having learned the business of dyeing mostly at the school of hard knocks I was always ready to change ways and means to give satisfaction to my employers.

However the work that was being done here, as far as I knew, was giving entire satisfaction. Our dyed and finished goods were favorably commented upon, so in reply to this man's criticism I said that, while I was grateful for it, I would like to see some hosiery dyed in the de-gumming bath and to judge of his merit, before I would make any change. "Will you send me, at my expense, some of your hosiery so I can see for myself?" I asked him. He said he would, but forgot all about it. And so did I, at that time.

Before he left the dyehouse this man said that he had a brother who had charge of a hosiery dyehouse in another part of the country. He de-gummed his hosiery first and then dyed them in a second bath. This brother of his had always told him he was a fool to dye in the

de-gumming bath (so he said), but he considered him a bigger fool for doing the dyeing the way he did it.

After hearing this a thought passed through my mind. Our visitor was the superintendent of a mill. While he may have had some knowledge of dyeing he was not actually doing it himself, but he could tell his dyer how he wanted it done, then let him do the worrying. His brother on the other hand was actually doing the dyeing and undoubtedly had tried and selected the method he thought more suitable to him, to get the best results with the least trouble. Who was right and who was wrong? Possibly there may be a right and a wrong way of doing other things, but as far as dyeing is concerned it seems that every dyer can do it the way he thinks best. If he gets away with it, and as long as he is giving satisfaction to his employer, why is he wrong?

That was what I thought. Why should I listen to this man and change my way of working as long as I had no trouble and my employer was satisfied with my results?

THE PROOF OF THE PUDDING IS IN THE TASTE

While preparing the paper mentioned above on dyeing by different methods I remembered what this man had told me. Thinking I could make it more interesting by telling the boys at the meeting that even brothers could disagree on dyeing methods, as well as on politics, the outcome of a ball game or a boxing match, I never thought for a moment it would give offense to anyone.

It surely was a surprise to me when I read the letter this man wrote me. He had resented my innocent remarks. Was I trying to discredit his reputation with my insinuations? How dare I to question his judgment and belittle his opinion! Was I trying to knock him off the pedestal where he was put by his many admirers and proselytes? How could an upstart like me make fun of his method of working when everybody else was eagerly seeking his counsel and advices!....He certainly thought he would teach me a lesson in good behavior and show me and the rest of the textile world that his way of dyeing was the best one and was ready to prove it.

"The proof of the pudding is in the taste" he said. Quoting verbatim from his letter, "You send me some of your hosiery in the grey to dye my way and I will send you some of mine for you to dye your way and then I will compare them and judge from the results which method is the best." In his resentment he never stopped to think that he could have gone to a department store and bought or borrowed a box or more of our popular and well known brand of hosiery and compare it with his own!

A PANICKY WITHDRAWAL

I took the challenge to my heart. In order to have an impartial judgment I wrote to Mr. Howes, the publisher of the AMERICAN DYESTUFF REPORTER, telling him what had occurred and asked his opinion. Mr. Howes promptly replied it would be a good idea to decide a much disputed matter. If we would submit our tests to him for final decision he would select a disinterested jury for the inspection of our work and have the finding published in the REPORTER for the benefit of all concerned. He said he was writing the challenger to that effect and would let me know when he heard from him what color and style to send to be judged. That suited me fine and I waited to hear again from Mr. Howes to get busy on my part. To my chagrin I got a letter later from Mr. Howes stating that the other party had withdrawn in his shell and wanted to consider the incident closed! May be that man thinks he has a strangle hold on dyeing in the degumming bath and is reluctant to show how it is done! In one paragraph of his letter to me he stated that he had no interest to show me or anyone else how his dyeing was done, meaning undoubtedly that if I did not know how it was just too bad for me.

We had started to dye our hosiery in an acid bath and never thought that we were going to be criticized for doing it. Later on we had occasion to congratulate ourselves for having persisted in our method. New fashions, different finishes and processes convinced us of the wisdom of sticking by our conviction.

When the new fashion required that we subdue the beautiful luster our hosiery possessed we were prepared for it. Barium sulfate had been used for de-lustering souple silk when for some reason that fiber got out of hand and came out shining from the dyeing. When used on hosiery barium sulfate dulled our hosiery if we kept it in solution. Owing to the difficulty of dissolving it and preventing its precipitation before it did the work, we tried other materials that by this time were being offered to the trade, and found what we wanted.

Among the products that we tried, our problem was to select the least expensive and the easiest to apply. None of the de-lusterers we tried gave us any trouble, so we were at first greatly surprised when we heard from hosiery dyers and salesmen of all the distress and trouble the new finish was causing. De-lustering silk was a nightmare to disturb the sleep of all the hosiery dyers. They were getting into all kinds of trouble trying to apply their de-lustering compounds to their dyed hosiery.

Whenever a dyer met another one the topic of conversation was dullness, delustering and kindred subjects. Invariably they found relief in condemning the practice. We had many visitors coming to see us. Tradesmen and dyers would come in, and after the usual greetings, they would ask if we had any troubles with the new dull finish. When shown some of the de-lustered hosiery they immediately would take it by the top and look down through it for streaks in the fabric that weren't there.

We also had occasions to visit some of our friends in other dyehouses, and be shown what their trouble was. The dull finish left on their hosiery clouds and chalky streaks that could hardly be removed once they were set.

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Processing

Knitted Astrachan Fabric

By **A. E. DOUGLAS**

THIS class of piece goods has a loop pile consisting of cross-bred worsted yarn, or in the better grade fabric, the pile is composed of a mixture of worsted and mohair fiber which has been blended before the yarn is spun. All types of knitted astrachan fabric have knitted cotton backing consisting of gray unbleached yarn. Knitting is done in the usual tubular form, with the pile surface inside the tube. When the goods leave the knitting machine, the yarn loops which form the pile lie flat and quite slack upon the cotton backing after the style of floats in woolen cloth woven in ordinary looms. In order to erect the pile loops, it is necessary to full the goods with soap. The shrinkage occurring during this process thereupon forces the loops into an upright posture and thus develops the distinctive character of the astrachan.

Fulling is performed in similar apparatus as is used for processing woven woolen fabric. We refer to the rotary fulling machine wherein the piece of goods to be fulled is made to pass through a narrow throat and a pair of squeezing rolls. Astrachan fabric is fulled for from one to three hours, according to the degree of shrinkage wanted. Goods with pile loops composed of worsted and mohair mixture require longer to full than the single fiber sort because the presence of the mohair retards fulling. It is customary to reverse the direction in which the pieces are being run in the fulling mill several times during processing since this procedure prevents the partially erected pile loops from flattening down or leaning too much in one direction as a result of the repeated passage of the piece of goods through the throat and rolls of the fulling mill.

Considerable experience on the part of the fulling foreman is required in judging the processing period for knitted astrachan. If fulling is overdone, the character of the fabric is marred for the excessive shrinkage felts the yarn in the pile loops to such a degree that they become stuck together at their bases, this state of affairs being usually termed "fast in the bottom" or "soldered-up" by folk in the business. Over-fulled fabric is always made worse during the coloring because processing in a hot neutral dyebath affects further shrinkage and in bad cases the goods become useless for sale as first class stuff. Hence it will be perceived that a certain amount of allowance for shrinkage of the goods during dyeing has to be made when fulling them.

Scouring of knitted astrachan fabric is generally done before fulling. The detergents employed comprise soap and ammonia. Only light scouring is necessary as a general rule, for the spinning oil used in the yarn is usually high grade stuff which is easily emulsified. As a matter of fact, the principal object in scouring this class of material is to get rid of grease stains acquired during the knitting. The apparatus used for scouring is usually of a similar type to the machine employed for cleansing ordinary woolen cloth in the rope form. Here we must point out that knitted astrachan is scoured, fulled and dyed while in the tubular form in which it is turned out from the knitters. By processing in the tubular form, the pile loops are protected from chafe marks and stains, since they are on the inner wall. Moreover, processing in tubular form carries the further advantage that the fabric does not roll up across the selvedges as it would be prone to do were it cut open and processed in that order.

After the fabric has been scoured, fulled and centrifuged, it is ready for coloring. Almost any type of piece dye kettle will serve for processing this class of goods. We prefer a stainless kettle with a reel 2 ft. 6 in. in diameter. From four to eight pieces of 80 to 90 yds. each is a customary processing load. The heavier varieties of the fabric are processed in batches of four. Some of these goods weigh as much as 2 lb. to the yard.

In most instances, the backing of knitted astrachan consists of gray cotton and it is necessary to union dye this along with the worsted pile. Either ready mixed union dyes as marketed by most dyestuff firms can be used for coloring the astrachan, or else one may build up the union dyes from suitable proportions of substantive and neutral acid colors. We always adopt the latter procedure as we find it cheapest. As a general rule, outstanding fastness to light in dyestuffs used for coloring astrachan is unnecessary since the wearing apparel manufactured from the fabric usually consists of the fashionable sort which is cast aside after a season's wear. Black, gray, wine, lido, brown, navy and bottle green are popular hues for these articles. We append the following brief particulars for use in processing the aforementioned shades on knitted astrachan.

Black is dyed at the gentle boil with proportions of Direct Black E and either Sulfonycanine Black, or Naphthol Blue Black. Sulfoncyanine Black gives the richer

blue-black hues on the pile and the shade is faster to rubbing and light than Naphthol Blue Black but costs more to process. Gray hues are obtained by dyeing with Direct Fast Black B. This substantive dye colors both animal and vegetable fibers uniformly at the gentle boil. As the gray produced is on the blue side it is sometimes necessary to flatten the shade with a little substantive orange and neutral acid color. For wine shades, we use combinations of Benzopurpurine 4B and a substantive bordeaux dye of the bluer type. Dyeing is done near the boil. Shading of the pile towards the blue side is done with neutral acid violet. The bright blue hue popularly known as lido is processed with mixtures of Brilliant Milling Blue, Direct Sky Blue FF and Direct Blue 2B. As Milling Blue is easily absorbed by animal fibers in the hot bath, dyeing can be done just below the boil. For brown shades, we use Diphenyl Deep Brown R; this gives uniform colors on wool and cotton when processed at the gentle boil. Shading can be done with Direct Orange G for fiery brown, or Benzopurpurine 4B for reddish brown. For olive brown, a proportion of Direct Green B is used along with the Deep Brown. In the production of navy blue on knitted astrachan we employ combinations of Sulfoncyanine Navy and Direct Black BH. If the shade is not sufficiently lively on the wool pile, blooming is effected by an addition of neutral acid violet of the A2R type. Bottle green is obtained with combinations of Direct Green B and a neutral acid color of the patent blue type. The latter serves to correct the yellowness of the green tone yielded by Direct Green B on the animal fiber, for the cotton backing shows bluer toned green than the wool pile when processed with Direct Green B.

Finishing processes for knitted astrachan are of the simplest; after coloring, the tubes of fabric are cut open with hand scissors and dried, then sheared to remove outstanding hairs. The goods are then ready for measuring and rolling for shipment to the buyer.

● INDUSTRIAL ANILINE & CHEMICAL CO.

F. A. Tomalino, well known in the field of chemistry and dyeing, announces the formation of the Industrial Aniline & Chemical Co. to manufacture textile chemicals, oils, finishes and specialties. The offices are located at Magnolia Avenue and Armstrong Lane in Germantown, Philadelphia. Mr. Tomalino has acquired considerable practical and technical experience during his thirty-four years' activity in the field of textile wet processing. It is stated that all products sold by this concern will be thoroughly tested and standardized before being placed on the market. Special compounds and finishes will be made up to suit individual requirements.

Associated with Mr. Tomalino are his two sons who also have had considerable practical and technical experience.

● TESTIMONIAL DINNER

Tribute was paid to David A. Ansbacher, retiring chairman of the Paint and Chemical Division of the Federation for the Support of Jewish Philanthropic Societies of New York City, at a testimonial dinner given in his honor by this division at the Metropolis Club on April 12th. Mr. Ansbacher will continue as honorary chairman and the active chairmanship will be shared by M. J. Merkin of M. J. Merkin Paint Co. and A. C. Horn of A. C. Horn & Co

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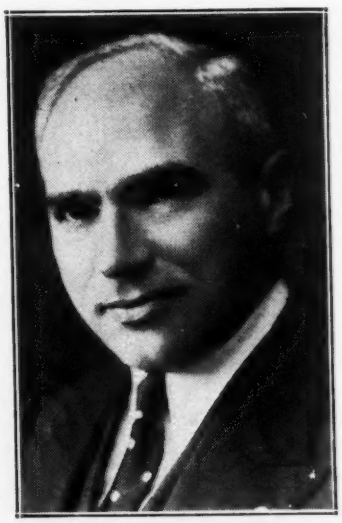
● VICTOR H. BERMAN HONORED

More than 500 social, political and business friends gathered last month at the Jersey City Elks Club, to tender a monster testimonial dinner to Victor H. Berman, president and founder of the Onyx Oil & Chemical Co., Jersey City, N. J., in honor of his inductance into office as member of the Palisade Interstate Park Commission.



A distinguished group, which included Governor Harold G. Hoffman, of New Jersey, paid tribute to Mr. Berman's character and accomplishments in business, social and civic work. His many philanthropies and his active work in behalf of under-privileged youths of Jersey City were lauded by speakers and guests at the affair.

The high spot of the evening was the formal presentation of the certificate of office, signed by Governor Harold G. Hoffman of New Jersey and Governor Herbert H. Lehman of New York. Mrs. Berman made the presentation of a diamond studded gold badge of office.

The officers and employees of the Onyx Oil & Chemical Co., surprised Mr. Berman with a gift of an onyx desk set and bronze statue in commemoration of the event.

Representatives of practically every silk and rayon dyeing firm in the industry were among those present.

PROCEEDINGS OF THE
American Association of Textile Chemists and Colorists

APRIL 22, 1935

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E. I. Du Pont de Nemours & Co., Wilmington, Del.

A. R. THOMPSON, Jr.—WILLIAM H. CADY, *Vice-Presidents*

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Lowell Textile Institute Student Section
Kenneth E. Leslie, Chairman; Chester M. Kopatch, Secretary

North Carolina State College Student Section
E. F. Anderson, Chairman; A. E. Shumate, Secretary.

Members should notify the **Secretary** immediately of all address changes

WINTER MEETING, PIEDMONT SECTION

THE winter meeting of the Piedmont Section was held in the King Cotton Hotel, Greensboro, N. C., Feb. 16, 1935. The technical meeting was called to order at 3:00 P. M. by the Vice-Chairman, Chester L. Eddy, in the absence of the Chairman, Paul Haddock, who was unable to attend due to illness.

The first paper was presented by Henry B. Dixon, Superintendent of Dyeing at the May Hosiery Mills, Burlington, N. C., on "Dyeing and Bleaching Pastels on Hosiery." The second paper was presented by Charles P. Walker, technical representative of the Activin Corporation of America, on "Materials and Methods for Solubilizing and Desizing Starches." The third paper was presented by R. R. Magill, technical representative of the Charlotte Chemical Laboratories, Charlotte, N. C., on "Cotton Preparation with Resist Elimination."

R. M. Mitchell of the Proximity Manufacturing Company, Greensboro, N. C., was elected Councilor to represent the Piedmont Section, and John L. Crist of the Calco Chemical Company, Charlotte, N. C., was elected to serve on the nominating committee for officers of the Association as a whole.

At the banquet in the evening, John B. Brown of Winston-Salem, N. C., gave a humorous talk which was very entertaining. The next speaker was John Paul Lucas of Charlotte, N. C., Vice-President of the Southern Public Utilities Company, who gave a talk on the Piedmont Section of North and South Carolina, in which he showed the great strides that have been made in the past twenty years in the development of this section from an industrial angle.

A. R. Thompson, Jr., Vice-President of the National Association, spoke on the value of membership in the American Association of Textile Chemists and Colorists. The next speaker was C. W. Edwards of the Physics Department of Duke University. Prof. Edwards gave a very interesting demonstration of the properties of liquid air.

The banquet was attended by 218 members and their guests.

The date for the Spring Meeting of the Piedmont Section which will be held at the Poinsett Hotel, Greenville, S. C., was set for Saturday, May 4, 1935.

Respectfully submitted,

T. R. SMITH,
Secretary.

Proceedings of the American Association of Textile Chemists and Colorists

Dyeing and Bleaching

Pastels on Hosiery*

By HENRY B. DIXON†

PAUL HADDOCK certainly gave me a lengthy subject for discussion, when he assigned me a paper on hosiery dyeing. And with such an indefinite subject, the prevailing question has been, "What are you going to talk about?" In return, I have asked the question, "What would you prefer that I choose as a subject?" Various ideas were suggested—one suggested a paper on control of pH in the dyebath to stop reduction of Sulfon Cyanine Black. To this I replied, "This subject has been discussed and cussed so much that probably a rest will help the pH in the dyebath." And then the subject of one bath, split bath, and two bath methods arose; also the subject of finishing full-fashioned hosiery. But the thought occurred to me to choose a comparatively new subject in the hosiery field since we have heard numerous papers and lectures on the above mentioned subjects. And mind you, we are yet a long way from perfection on any of them. So I have decided to delve into the subject of dyeing and bleaching pastels.

About five years ago last December I had my first experience with pastels. Little did I realize the marvelous possibilities obtainable by the proper selection and manipulation of colors. And today as you know, it is one of the outstanding lines for early spring and summer. I might state here that the types of pastels referred to are handled entirely in the dyebath and are not ingrain backgrounds bleached.

In the beginning the first types were composed of acetate and rayon construction. The acetate was dyed in various pastel shades and the rayon tops, heels, and toes were bleached in a soap bath. This process was rather simple, and few complaints have arisen. The procedure used was to dye the acetate in a soap bath at 190° F. for thirty minutes. A little trisodium phosphate or ammonia aids the soap to give better detergent action. The bath was dropped and the load was given 175° rinse to remove excess color from material. While this rinse would seem unnecessary, I have noticed on shades, for instance light blue, without the rinse dye spots showed in the heels after bleaching. Another point at this stage of the method, should the color be very heavy, around 1% dye, is to add a little soap, ammonia and hydro to this 175° rinse. This is allowed to run until tops have a yellowish or reduced appearance. Drop, rinse free of hydro and prepare for bleaching. The temperature is best determined by the heaviness of the shade. For light blue 115 to 125° F. gives best results. Heavy shades require around 135 as a maximum. This higher temperature tends to free the cotton of acetate colors much faster. The amount of bleach required also is in proportion to the heaviness of the shade—6 to 8% of the weight of the material is a good average.

There are several types of bleaching compounds used for pastel work. The one most generally used is sodium hypochlorite. This product is made by passing chlorine gas into caustic with proper provisions made for cooling; as the result, $NaOCl + NaCl + H_2O$ is formed. The bleach bath is started cold, as the strength of the hypochlorite when allowed to touch warm goods tenders them. The solution is well diluted and admitted to the bath. The heat is raised to the proper temperature and allowed to run for twenty to thirty minutes. Contrary to popular conception, it is the release of the oxygen and not the chlorine itself that accounts for the bleaching action, as one sees from the reaction $2NaOCl = 2\ NaCl + O_2$. The bath is then dropped and rinsed at 100° F. to remove the excess hypochlorite. This point is very important, as the action by the souring agent when added to the bath will cause a reduction of the acetate colors. Refill machine with cold water and add sulfuric acid to produce acid litmus. Allow to run several minutes to completely neutralize any trace of chlorine, rinse free of acid with cold water and give warm bath with a little softening oil for boarding.

I might say that when the material is diazotized and developed, that is, black on the acetate, with rayon and tops white, the material should be stripped after dyeing, as the excess color is easier removed at this point than after developing. Then bleach in the usual manner. Even with all these precautions the tops are stained considerably. To overcome this, add a little hydro after the load

* Presented at meeting, Piedmont Section, Feb. 16, 1935.
† Supt. Dyeing, May Hosiery Mills, Burlington, N. C.

has been finished at about 110° F. Then wash free of hydro.

There are several other formulae used for this type of work, one of which is hydrogen peroxide in the dyebath. The material is first soured to remove oils and tints. A fresh bath with both bleaching compound and dyes is added. This is followed by light stripping. Some bleach first, then dye, and strip last. While there are tricks to all trades, those accustomed get very good results. The main objection to this process is the fact that the tops retain a distinctive tint that corresponds to the body color and gives the stock a muddy appearance. When packed and assorted to the box, this appearance gives one the impression of an incomplete job.

As stated in the beginning, this is the simplest method used for dyeing pastels. But to run into real trouble add another fiber—thread silk,—then an entirely new picture appears. Allow me to say here that the most important point in dyeing pastels is the selection of colors which are fast to bleaching and washing. Most of the pastels made prior to the past two years were constructed of rayon and acetate with some form of ingrain clock dyed with vat colors. The acetate was dyed according to the above formula and then bleached. In this day when so many colors are wanted and different backgrounds required, a warehouse is needed to store the grey goods prior to dyeing. And too, the life of a pattern is so short that it is practically discontinued before all of the sizes and backgrounds are knit. For example, for pastel work about ten colors is the average; at least four backgrounds would be used—say, black, red, blue and gold. This would require a knitted stock of every background to get out an order, whereas when the backgrounds are dyed in the hose only one size is necessary. Then should this pattern be taken off of the market, if color range is not satisfactory, any additional backgrounds may be added. On the other hand, if dyed backgrounds are used, often times a loss must be taken due to unbalanced backgrounds and poor assortment of sizes.

When this problem of dyeing backgrounds presented itself, I immediately wrote all of the leading dyestuff manufacturers for colors for dyeing silk, leaving acetate white, fast to bleaching, and standing a moderate hydro stripping. The response at that time was very disappointing. Of course, we had a blue that would stand the above treatment, but we need a red and yellow to produce the compound shades. Finally this was achieved, and today any shade may be produced on either silk or acetate with bleached top.

There seems to be a drift toward pastel tops, heels and toes, leaving acetate white and dyeing thread silk a contrasting or heavier shade. For example, a pastel yellow shade something like wheat gold in the top, acetate effects to remain white, while silk clock or design effects to be dyed dark green. This color combination will require a two bath operation. The silk is dyed first in an acid bath, rinsed, bleached with hypochlorite, soured, and then dyed in a fresh bath for the pastel yellow. The reason for this, of course, is to produce a clear clean color on the tops, as the stain from the silk color is so great that it cannot be removed sufficiently by soaping.

Those who have experienced some of these troubles know what the knitting room has unloaded on the dyehouse, and no doubt there are those present who have methods which will more greatly simplify these processes.

I would like to hear from some of my friends engaged in the dyeing business.

DISCUSSION

Mr. Dowd: I would like to ask Mr. Dixon, when he is using hydrosulfite to strip, whether he finds it strips better in the alkaline or acid bath.

Mr. Dixon: I find that it strips better in an alkaline bath.

Mr. Dowd: Would it clean the tops better if sulfoxalate was used instead of hydrosulfite?

Mr. Dixon: The use of sulfoxalate would require a slightly acid bath, whereas the stain is much easier removed in an alkaline bath.

Mr. Miller: You said you stripped after dyeing, before you developed. Is that right?

Mr. Dixon: Yes.

Mr. Miller: Do you strip the yellow tint off the hose before you dye?

Mr. Dixon: We get off most of it.

Mr. Miller: Have you found after doing that, that your black will break down and be red instead of black?

Mr. Dixon: No, I have not. That depends on the developing agent you use, I imagine.

Mr. Miller: Are you using BON developer?

Mr. Dixon: Yes.

Mr. Miller: Have you dyed any navy shades on these pastels?

Mr. Dixon: We are not dyeing navy on acetate and bleaching the tops. I have dyed navy for sample purposes. It is necessary to strip immediately after dyeing and repeat at a lower temperature after bleaching.

Mr. Miller: Have you been able to get it clean?

Mr. Dixon: Fairly clean, yes. You can get by with it.

Mr. Black: When coloring black on acetate, did you notice any difference in the shade in the strip after you dyed?

Mr. Dixon: Yes.

Mr. Black: Does that pull your shade off?

Mr. Dixon: Not much.

Mr. Black: What temperature do you use in stripping?

Mr. Dixon: 150° F.

Mr. Black: Is there any difference between stripping after your dye is developed? Which is the better result?

Mr. Dixon: You get a better white when stripping right after you dye, by getting rid of the surplus color on

the tops. Of course it is necessary to strip after developing. This diazotizing and developing black on acetate and getting a white top requires a lot of time and patience.

The Chairman: We thank Mr. Dixon for this fine paper. (Applause).

MEETING, LOWELL TEXTILE INSTITUTE STUDENT SECTION

A MEETING of the Lowell Textile Institute Student Section was held on March 28, 1935, with attendance of about 70 members and guests. Henry Barker Burke gave an interesting talk on dyeing machinery, particularly as related to worsted top dyeing.

Respectfully submitted,

CHESTER M. KOPATCH,
Secretary.

WINTER MEETING SOUTHEASTERN SECTION

THE Winter Meeting of the Southeastern Section was held Saturday, March 2, at the Ralston Hotel, Columbus, Ga.

The meeting was well attended, there being approximately one hundred or more textile chemists, dyers and finishers present from the neighboring mills of Georgia, Alabama, the Carolinas and Tennessee.

An interesting program, consisting of the following numbers, followed:

1. E. J. LeFort, of the Avondale Mills, Sylacauga, Ala., presented a delightful and instructive paper on "The History of Indigo and Its Dyeing Properties."

2. "Stainless Steel in the Textile Industry" was discussed in a most interesting and helpful manner by J. E. Goodavage, representing the Republic Steel Corporation.

3. George Feindel, Union Bleachery, Greenville, S. C., added to the enjoyment of the program by giving his paper on "Water for Textile Purposes."

New officers for the ensuing year were elected, as follows:

Chairman—C. A. Jones, Director, A. French Textile School, Georgia Tech, Atlanta, Ga.;

Vice Chairman—W. F. Christman, Russell Manufacturing Co., Alexander City, Ala.;

Secretary—W. F. Crayton, Dyestuffs Division, E. I. du Pont de Nemours, Dimon Apartment, Columbus, Ga.;

Treasurer—John B. Farrell, Treasurer, Lanett Bleachery & Dye Works, Lanett, Ala.

After voting to hold the Spring Meeting at Auburn sometime in April, there being no further business, the meeting adjourned.

Respectfully submitted,

C. A. JONES,
Secretary.

NOVEMBER MEETING, NEW YORK SECTION

THE November meeting of the American Association of Textile Chemists and Colorists, New York Local Section, convened at eight o'clock on Friday evening, November 23, 1934, at the Alexander Hamilton Hotel, Paterson, New Jersey, Mr. Ephraim Freedman, Chairman of the Section, presiding.

. . . The business session took place, after which the scientific program was held as follows:

Chairman Freedman: We have two interesting speakers here this evening, the first of whom needs no introduction whatsoever. He has been active in the New York Section for some time, but recently we have missed him, and I am very happy that an excuse for getting him here this evening has been provided by the Chairman of our Program Committee. I refer to Mr. Philip H. Stott, who is connected with the Dyestuffs Division, of E. I. du Pont de Nemours & Company. Mr. Stott will speak on "The Preparation of Rayon Piece Goods Particularly for Discharge Printing." I am sure you will all enjoy his talk very much. Mr. Stott! (Applause.)

Philip H. Stott: Mr. Chairman and Members of the New York Section: I am a little bit afraid that I may wear my welcome out. I believe this is the third time in two years that I have spoken before the New York Section, and I must admit I am rapidly running out of subject matter (Laughter). However, I am always very glad to come up and "see you some time" and I hope that what I have to say tonight will not be a disappointment, because in coming to talk to you practical men about the dyeing of rayon piece goods, I appreciate the fact that I am stepping on dangerous ground for, when all is said and done, a good many of you men are actively engaged in it, and you undoubtedly know a great many more of the tricks of practical rayon piece goods dyeing than possibly can come to at the attention of any person who is primarily attempting to sell service and sell dyestuffs by that means.

Just by way of introduction I want to say at the outset that I am going to more or less confine my talk to developed colors, although we will mention others in passing, but it is at all events upon the subject of developed colors that I base this short paper because we feel that developed colors are of great importance for the production of fast dyed goods.

. . . Mr. Stott then presented his prepared paper . . .

Proceedings of the American Association of Textile Chemists and Colorists

The Preparation and Dyeing of

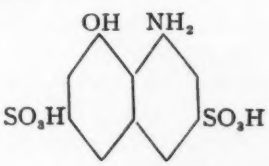
Rayon Piece Goods

For Printing

By PHILIP H. STOTT†

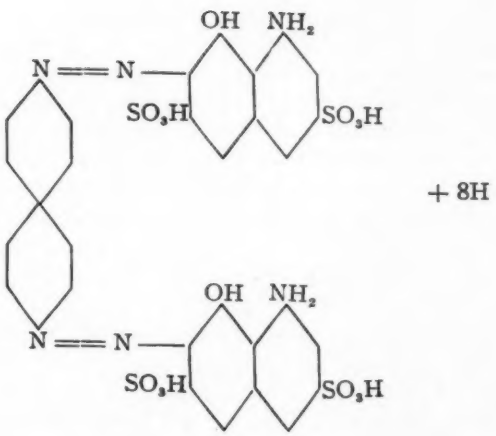
AS MOST of you know the act of discharge printing is based upon the ability of dyestuffs to split up when treated with hydrosulfite compounds or other reducing agents. The dyestuffs most susceptible to this reaction are those of the azo series, which includes both acid colors and substantive or direct colors. It is probably not necessary or desirable to go into the chemistry of the colors themselves other than to state that an azo color contains one or more azo groups, that is N = N. The azo colors are prepared by diazotizing an amine and coupling it to a secondary component or components which may be naphthols, naphthol sulfonic acids or amido naphthol sulfonic acids. Inasmuch as our subject largely limits us to substantive colors, suffice it to say that these usually contain at least two azo groups, and for a more complete picture of constitution, theory, cause and effect I am merely going to refer you to Mr. A. R. Murphy's paper which appeared in the AMERICAN DYESTUFF REPORTER of July 30, 1934, and the subsequent discussion. The point I want to make here is the importance of the azo group in subsequent discharge work. If a dyestuff such as the well known Direct Blue 2B is treated with hydrosulfite compounds the latter exert a reducing action on the azo (N = N) linkages and split them, destroying the color. Originally the color is made by combining one molecule of benzidine with two molecules of "H" acid, resulting in a disazo dyestuff

Benzidene

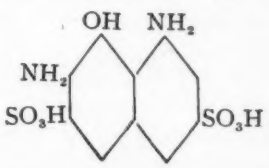


H Acid

The resulting dyestuff, then has the constitution



After treating with hydrosulfite the N = N bonds are broken and the products of the reaction, theoretically, are one molecule of benzidine and two molecules of what we can call amido H acid having the formula



Both of these compounds are colorless in that they have no affinity for vegetable fibers, and it is upon this fact that the theory of discharge printing rests. I stated in the opening paragraph "The act of discharge printing is based upon the ability of dyestuffs to split up when treated with hydrosulfite compounds or other reducing agents" and to this we can now add with somewhat greater understanding "into products which have no affinity for the fiber on which the ground shade has been dyed." To complete the picture it must now be pointed out that not all of these products of reduction are colorless, or have no ultimate affinity for the fiber. At least half of the products of any reduction of this kind are amino bodies of highly saturated molecules. Such compounds are apt to be very unstable and oxidize rapidly to highly complex molecules

*Presented at Meeting, New York Section, November 23, 1934.

†Dyestuffs Division, E. I. du Pont de Nemours & Co.

which definitely do have affinity for the fiber. As a general rule this oxidation process is enhanced by any alkaline condition which may be present, and, once formed, it is not easy to remove the products of oxidation, by any methods suitable for use by the textile printer. These products of oxidation are generally yellow or brown in color and I don't have to ask you if you have ever seen them. Even though we may not thoroughly understand all the complex chemical reactions involved in their formation we do know something about how to prevent them forming or at least to create conditions which discourage their formation. The simplest of all of these is not to "keep on the alkaline side" but rather to encourage "acidosis." In white discharge printing this is comparatively easy but in vat color prints over a developed ground it is not. You will pardon me, I feel sure, if I digress again and lapse into theory once more before coming to the main point of this talk, but the fact is that considerable research work has been done to study constitution of dyestuffs in relation to dischargeability. This means that the behavior of products of reduction has been investigated with a view to elimination in the final product, of any original components which produce reduction products giving colored compounds on re-oxidation.

Processes for the manufacture of dyestuffs have been carefully examined to ascertain if any decomposition products or products of side reactions are present to influence final results on the fiber. We know, for instance, that diazoamino or diazohydroxy compounds are apt to cause trouble and consequently every effort is made to prevent the formation of such compounds in the original dyestuff. We know, that the possibility of side reactions is more prevalent in complex molecules than in simple ones and it is no easy task to find them and still harder to eliminate them. So when next you are told that somebody's direct blue XYZ has been improved in discharge properties believe that the statement is made as the result of a careful and painstaking investigation into the theory underlying the manufacture of that particular dyestuff, and that tests made indicate that a real improvement has been effected.

Before going on to the second portion of this paper I want to point out something which has undoubtedly been told you before, and that is the relation between direct and developed dyestuffs. Since these are the ones generally used for dyeing the ground shades, we need concern ourselves only with them. Essentially both types are direct colors as far as chemical constitution and affinity are concerned—the major difference is that the developed colors contain one or more free amido groups which make them susceptible to the action of nitrous acid. In other words when you develop a color on the fiber you actually go through the same chemical operations that a chemist goes through when he makes an azo color. The main difference is that in most cases you are actually making a very much more complex product. Now, if the chemist in building his complex molecules is constantly on the watch for impurities, side reactions and other factors which influence results, should you also not use extreme care in carrying on the building up of a still more complex molecule. This certainly must be admitted and it applies right from the preparation of the goods down to the finished cloth.

Undoubtedly a great many opinions exist on the best method or methods of preparation. A lot depends on the type of cloth, and it is here that long mill experience such as many of you have had is an invaluable asset. Good material deserves careful preparation to remove the oils and size used in weaving.

Most of the sizes used nowadays are not particularly difficult to remove, but the degree of crepeing should first be obtained by experiment before the cloth is wetted out. A treatment with caustic soda will have a great influence on the crepe and will also increase the affinity of the cloth for color. However, such treatment is not always necessary or even desirable. A milder alkali, such as soda ash, trisodium phosphate or even ammonia, can be employed, but the use of any of these reagents is indicated by the crepe required. For boiling-off, probably nothing has been found to quite take the place of a good strong soap solution, possibly with the addition of some ammonia or a sulfated fatty alcohol. As a general rule rayons today need very little, if any, bleaching, and if they do, peroxide or a very mild hypochlorite will usually produce sufficient whiteness.

Discharge printing can be divided into two major sections—white and colored prints. For white discharges on goods which do not have to stand much washing many direct colors are very suitable. The selection is made from those which have sufficient fastness to water not to bleed back into the white when the goods are washed to remove the gum. In a few cases an aftertreatment with formaldehyde is an advantage but the number of colors improved by such treatment is rather small and for goods which are intended to be washable it is best to use developed colors. Formaldehyde is a very active compound and it does peculiar things. It is possible to get all kinds of condensations using formaldehyde as a condensing medium, in fact it is fitting more and more into synthetic organic chemistry. A formaldehyde bisulfite compound, for instance, is used largely in making couplings of amines one to another. The condensation product forces the coupling into a certain position on the ring and the formaldehyde bisulfite can be split off rather easily, and the subsequent product made susceptible to the nitrous acid. It is rather difficult to say just what the action of formaldehyde is in aftertreatment but unfortunately there seems to have sprung up an idea that formaldehyde is a

cure-all for all evils, and that the aftertreatment of any dyestuff with formaldehyde is going to improve its fastness to washing.

This idea is generally an illusion, because with the exception of possibly twelve colors—I will say twelve just for the purpose of argument—there are no dyestuffs, direct dyestuffs, which are definitely improved by formaldehyde aftertreatment. The successful aftertreatment with formaldehyde, of course, involves a chemical reaction, and if a chemical reaction does not occur there will be no improvement. About all the formaldehyde will do in the majority of cases is to remove excess color which might possibly wash back into the white on subsequent discharge. Of course, there are notable exceptions. Ordinarily, Direct Black E is susceptible to formaldehyde aftertreatment. Just what occurs is probably not completely understood, but it is improved in fastness in washing quite materially; in fact, for about three washings it is almost as fast as a developed black, but after that the effect of the formaldehyde is lost. The well known Pontamine Fast Black PG, is susceptible and definitely improved, but if somebody says that Blue 3B or 2B, or other well known colors of similiar constitution are improved by formaldehyde aftertreatment, he is quite mistaken. And this, of course, is where the developed colors come in. They being essentially direct colors, are dyed as such. Having at least one free amino group, when treated with nitrous acid, they definitely and clearly produce new chemical compounds when developed with betanaphthol, or Developer Z, or any of the other well-known developers, and according to all established laws do create new compounds; there is no imagination about it. It is very easy to prove. Of course, a great many direct colors on being subject to washing are not at all fast. After development the subsequent product changes definitely in shade and there is definite evidence of the formation of a new dyestuff on the fiber which has entirely different properties.

Subsequent development of vat colors used for printing must be done at fairly high temperatures and direct colors as a class will not meet the requirements and will bleed into the discharge. Developed colors are available from a variety of sources and in a wide variety of shades. It must not be assumed that all of them discharge white in all depths and by all methods. Information is readily available from the suppliers as to the rating given each color under the conditions of testing used. The Pontamine Diazo colors represent such a line of dyestuffs and as I endeavored to point out in the early part of this paper represent the result of careful and painstaking research work to produce products as free from impurities as possible.

The developed colors, being essentially direct colors, are dyed as such. The type of machine is dictated by the nature of the cloth, and it is not necessary to discuss this phase. Penetration and level dyeing can be improved by the addition of a small quantity of a fatty alcohol sulfate such as the Gardinols or Brilliant Avirols. In the diazotizing operation comes our first chance to cause subsequent difficult. Diazo compounds are notoriously unstable especially to comparatively high temperatures and some of them to bright sunlight, so it is advisable not to exceed 60° F. in the diazo bath and not to expose the goods to bright sunlight. While any decomposition of the diazo compound will not necessarily affect the discharge, it might in certain cases. It would be more apt to affect the final shade, cause uneven dyeings and reduce the efficiency of the operation in general.

Equally important is a *thorough* rinsing of the goods in *cold* water before developing. Emphasis is put on *cold* water and *thorough*. If any nitrous acid is left in the goods and the developer happens to be metatoluylene diamine you are apt to form Bismarch Brown by the reaction of the two chemicals. If the rinse water is too warm the diazo compound may decompose to a certain extent, or even couple with itself to form very complex compounds which may affect discharge properties later on. Nitrous acid is a very active chemical and if there is any doubt as to the efficacy of the rinsing, test the goods by pressing a piece of starch-iodide paper on them. It will turn blue if nitrous acid is still present. After coupling, which will probably cause no special difficulty, if controlled for temperature, the rayon should be thoroughly washed to remove all traces of alkali from the developing bath. If left in, this alkali will probably be a contributory cause to a yellowish white. Before delivery to the printer the goods should be very well soaped at 120° to 130° F. to remove any loose color from the coupling operation and then rinsed in warm water to remove any further traces of alkali remaining after soaping.

To enable the printer to do his part to the best advantage the cloth should come to him as free from alkali, oils and other chemicals as possible.

For the actual printing again much depends on the structure of the cloth; depth of shade and nature of pattern. These will indicate the correct depth of engraving to use; viscosity of printing paste; quality of pigment and albumin; conditions of ageing and the use of a suitable penetrating agent. We have found that a good general formula is as follows:

Sulfoxite C	10-20 parts
TiO_2—glycerine (50-50)	20 parts
Albumin (50% Sol.)	10 parts
Thickener	60-50 parts

The pigment and glycerine should be ground thoroughly in a paint mill. The thickener can be one of the prepared textile gums; starch-tragacanth paste; or all tragacanth. The latter is the most expensive but gives the best results.

If a penetrating agent is necessary the addition of 2-4 parts Neomerpin VD or Brilliant Avirol L-144 will be found beneficial. In some cases it may be found helpful to add about 3 parts of hydrosulfite concentrated to the discharge paste. This actually starts the reaction of discharge or splitting the azo linkages before the cloth gets to the ager.

The actual decomposition occurs when the heat and steam of the ager come into contact with the Sulfoxite C decomposing this compound into its active components so now we are back to our original story of splitting the azo groups and are faced with the problem of getting rid of the amino bodies which are the products of decomposition. There are several important factors which enter into their removal.

The cloth should not be stored for any length of time after printing or after ageing. By doing so we are inviting oxidation which is the one thing we want to avoid as much as possible. Particularly after ageing, the goods should pass through the remaining operations as rapidly as possible. The main requirement now is to thoroughly and completely remove all products of decomposition. Some people prefer a water wash only. Perhaps this is not entirely advisable unless warm water is used—there is always a small quantity of dissolved oxygen in cold water. We feel that a good neutral soap wash is very satisfactory because the detergent properties of the soap are enough to offset the mild alkalinity of a soap solution. The use of a product like Gardinol WA Conc. either alone or as an addition to the soap bath is perhaps the best, combining as it does strong detergent action with no trace of alkalinity. There is always the question of whether our object has been accomplished, and whether what seems like a perfect white will turn yellow on storing. An excellent control is to take a swatch of the goods after washing and put into a weak solution of sodium perborate or hydrogen peroxide. If any yellowing of the white is apt to occur in say two weeks time, it will usually show up immediately by this test and further washing of the goods is indicated.

There is a paradox to all this which I feel tempted to draw at this point in conclusion of these few remarks. It is not incongruous that the dyestuff chemist should have to be so very careful in synthesizing and making a color, and then ask you dyers and printers to be just as careful in achieving its destruction?

DISCUSSION

Chairman Freedman: Are there any questions that any of you have for the speaker?

It gives me great pleasure to introduce Mr. Morris Blackman, Assistant Superintendent of Printing and Colorist, Textile Dyeing Corporation, who will talk on "Print Shop Procedure Relating Especially to Silk and Rayon."

Mr. Blackman: Mr. Chairman and Gentlemen: This might better be termed a mill paper. I have tried to avoid theory as much as I possibly could, and if I should offend any of my brothers in the trade I hope you will not feel too badly about it. The scope of this talk is rather limited. There are a number of reasons for it. One very good reason is that we in the mill are not supposed to divulge anything that might be of any use to our competitors. (Laughter.) Rather than rush hurriedly through the entire print procedure, I think it might be a better idea to select a few of the more interesting phases of the work and dwell on them.

. . . Mr. Blackman then presented his prepared paper . . .

(See next page)

JANUARY MEETING, NORTHERN NEW ENGLAND SECTION

A REGULAR meeting of the Northern New England Section was held January 4th, 1935 at the Hotel Vendome in Boston, Mass. at 7:30 P.M. The usual dinner preceding the meeting was served to 65 members and guests.

C. Earl Hays of the Telecolor Corporation presented a paper on "Color, Its Characteristics and Phenomena" describing the application of the "Telecolor" to the coloring of textiles. Mr. Hays' paper aroused much interest and brought forth many questions concerning the apparatus which he has developed.

Respectfully submitted,

CLARENCE A. NUTTING,
Secretary.

JANUARY MEETING, NEW YORK SECTION

THE January meeting of the New York Section convened at eight-twenty o'clock on Friday evening, January 25th, 1935 at the Chemists' Club, New York City, following an informal dinner.

Rudolph Rebold, president of the Toxic Gas Research Corp., and Louis D. Clement, chairman of the executive committee of the same corporation, were the speakers and discussed the technique of rendering textiles actively antiseptic. Considerable interest was manifested by those who heard the papers.

Respectfully submitted,

P. J. KENNEDY,
Secretary.

Ed. Note: The papers presented at the above mentioned meetings will be published in the Proceedings in the near future.

Proceedings of the American Association of Textile Chemists and Colorists

Print Shop Procedure

Relating to Silk and Rayon*

By MORRIS BLACKMAN†

PRINTING is divided into four major operations. In the order of procedure they are:— color-mixing, printing, steaming, and washing. We'll discuss them in that order.

In this locality there are in general use, three methods of mixing colors:— the American, English, and metric systems. The latter is referred to, invariably, as the "French" system. It differs from the first two methods in *one* vital respect—in the manner of preparing the color for the print machine, and particularly in the method of preparing the dyestuff for silk printing.

In the American and English systems, we weigh out the dyestuff content of each individual pail of color. This dyestuff is dissolved, and strained into the thickener.

In the French system, however, we work with what is known as a "standard." A standard is nothing more than a dyestuff which has been dissolved and mixed with the printing gum. The dyestuff content of a standard varies from 4 to 8%, depending upon intensity, and will bulk from 10 to 40 liters depending, of course, upon the rate of consumption. When our standards have been prepared we have, in fact, a stock of paste colors. To make up a required pail of color for the print machine, we need merely measure the proper quantity of the requisite standards. No time is lost, as you can see, in weighing out and dissolving the powder. That has been done beforehand.

It may be seen that this method of working with standards offers two distinct advantages—greater accuracy, and even greater speed. This is especially desirable during the sample season when runs are small, and we have so many changes. You know that very little time elapses between combinations, and the pressure is on to get the colors out with as little lost time as possible.

It has probably occurred to many of you that in the American and the English systems, we have the advantage of a paste freshly prepared from the powder. I think this advantage is not so great as it would seem. You see, in the French system, we select, as far as is possible, those dyestuffs which are comparatively stable. In some instances, of course, we have no choice but to use the one available type, as is the case with acid rhodamine, or the discharge blues. In preparing *these* standards we make up only small quantities, enough to last a few hours, which isn't long enough to produce any harmful effect on the brilliance or the working qualities of the color.

To sum up:— The principal advantages of the American and English systems are these:— (1) a freshly prepared color; and (2) an intimate control of the consistency of the paste. On the other hand, the superior features of the *French* system, are (1) a definite saving of time which makes for increased production, and (2) a greater degree of accuracy.

I may be laying myself open to attack, but I venture the remark that the benefits to be derived through the use of the weighing-out systems are more theoretical than actual, and are more than offset by the definite advantages of the standards method.

The preparation and running of vat colors (the type generally printed on rayons) present an entirely different set of problems. By a vat dyestuff is understood (broadly speaking) an organic pigment, quite insoluble in its original state, but which becomes soluble when subjected to the action of an alkali reducing agent. In this state it is absorbed (in the ageing) by the fibers on which it is printed and is subsequently re-oxidized which causes it to become, once more, quite insoluble.

Vats are generally made up in one of two ways. In the first, and most commonly used method, we add one quart of the vat stock to each gallon of vat gum to make what is known as the four light standard. In a second method, the vat is pre-reduced, as in this manner. We measure out the vat stock, add to it a bit of conc. hydro and caustic, apply heat until the vat is partially reduced, and then add the necessary quantity of vat gum.

This second, or pre-reduced, vat color is supposed to respond more readily in the ager, and is held by some to give a better color yield. However, we have run comparative tests, and find there is no perceptible difference between colors prepared in one way or the other, if we employ a well-balanced vat gum, and the ageing conditions are right.

*Presented at Meeting, New York Section, November 23, 1934.
†Asst. Supt. of Printing and Colorist, Textile Dyeing Co.

This vat gum of which we speak, is usually a boiled British-gum-starch mixture, to which has been added the reducing medium (hydrosulfite), the solubilizing agent (potash or soda ash), and a hygroscopic material, the one most commonly used being glycerine.

The vat gum containing as it does such a large percentage of solids, must be prepared very carefully. Every ingredient entering into the gum must be free of all grit, or any foreign matter which may cause trouble in the print machine. It is not enough to strain the paste when the color is made up for the machine. Every precaution should be taken to eliminate these troubles at the source. This is particularly advisable with those of us who are not equipped with such devices as colloid mills and vacuum strainers. This may seem a superfluous operation, but the extra effort is amply rewarded by the comparative freedom from streaks and snips.

Of all that is interesting in the work of the print machine, we have elected to speak of a much neglected operation, and that is the drying of the print. On the face of it this would appear to be one of the least important steps in the entire process; but actually it has a very great influence on the depth and brilliance of the shade, especially on the heavier fabrics.

When we print a color on the cloth, the pressure of the print roller forces the paste on and around the fiber, but not completely through it. Just as long as any appreciable amount of moisture remains in the print the threads will continue, by means of capillary attraction, to absorb that moisture and with it the dyestuff. By the same token, just as soon as the print is dried, penetration ceases.

It is a fact that this penetration of the dyestuff into the heart of the fiber is a prime requirement, if we are to obtain that fullness of shade which the customer demands. Lacking it, our shades are dull and lifeless, particularly on dark grounds.

It follows then that our prints should be dried just as slowly as possible, in order to derive the greatest benefits from the dyestuffs. Heat in the drying unit should be kept at the minimum—a temperature sufficient to avoid mark-offs, and no greater. Proper circulation of air, by the way, is quite as important as the heat in the dry box. Unfortunately, some types of dryers do not permit of these lower temperatures, unless the speed of the machine be reduced to such an extent as to interfere seriously with production.

Of all types of drying apparatus now on the market which have come under our observation, the whirlwind or spider type appears to be the most suitable, but even this leaves much to be desired. In a machine of this type, the piece is so conveyed, that the face of the cloth does not come in contact with any surface until it has passed half way through the box, by which time the danger of smearing or marking off has been well nigh eliminated. It is likely that the future will bring about a change in dry-box construction. We will probably see larger boxes, permitting high-speed production and low-temperature drying. Provision will probably be made for the introduction of directed air currents, and the automatic cooling of the piece after drying.

Steaming, and especially ageing, is probably the most interesting of all print operations. We will consider this problem from two angles—first, and more important to us, the effect which ageing has on the printed piece; and secondly, the ager from a mechanical point of view.

For those who are not entirely familiar with the subject, we will give a running description of the typical ager, before going on to the more controversial part of our talk.

The ager is an iron chamber, approximately 5 feet wide, 10 feet high, and 25 feet long. Inside the box is a horizontal arrangement of rollers. One row of these rollers (about 35 in number) are set 8 inches apart, and 16 inches below the top of the ager. Another row, 36 in number, also set 8 inches apart, are fitted near the bottom of the chamber. The distance between the top and bottom rows is about 6 feet.

In the bottom of the ager is a depth of water, from 6 to 10 inches. Under this water is a perforated pipe through which the steam enters the ager. Over the water is an arrangement of plates, staggered so as to permit a free flow of steam from the water, but which at the same time, prevents the water from splashing on the cloth. Along the sides, on the inside, is a set of steam coils, which are used to facilitate the heating of the machine.

The top of the ager is formed by a series of steam chests, which are supposed to carry enough heat to prevent the condensation of steam. At the back of the steamer is an exhaust which draws off a certain amount of the impurities which are formed during the ageing reaction. This exhaust also serves to keep the steam in circulation, to a certain extent.

So much for the inside of the ager. I don't think an explanation of the exterior is necessary to our undrestanding of the problem, except that I may say the outside walls are well insulated to prevent escape of too much heat.

To start the ager, we heat it, rather slowly, by means of the steam plates at the top, and the closed steam coils at the sides. When the temperature reaches 180 to 200° F., we admit a very small quantity of open steam through the open steam pipe lying in the bottom of the ager. When the thermometer indicates a temperature of about 214° F., we shut off those closed steam coils we mentioned, and open the valve further on the open steam pipe, permitting a constant flow of steam to circulate in the ager. This steam must be of sufficient volume to discharge the ground or to reduce the vat which we intend to run through the ager.

The cloth enters the ager by means of a slot or mouth-

piece at the front, is passed over the first roller of the top row (which we mentioned before) travels down and under the first roll of the bottom row, then continues up and down, over and under succeeding rollers. When the piece reaches the back of the ager it passes over the top rollers, and out the same aperture through which it entered. It takes from 4 to 6 minutes for the piece to complete this circuit, a distance of some 160 yards, the average speed or output of the machine being about 35 yards per minute.

Now, that is a rough outline of the mechanics and the method of this machine. Let us see what happens as the piece runs through the ager.

First, the steam acts upon the hydrosulfite which is printed on the piece. The ground is discharged and, in the case of vats, the print is reduced to a soluble compound.

As the cloth continues to run through the ager we notice a gradual increase in the temperature within the ager. The thermometer will indicate a temperature of as much as 220° F., and there are pockets of stagnant heat which will often run as high as 235° F.

A vat, in order to reduce quickly and completely, requires a great deal of so-called saturated steam. Yet here we have a superheat of considerable proportions. How does this condition arise, and what can we do to prevent it?

(Right here I want to tell you that I'm not a seeker of perfection in ageing. The present-day machine does a good job; but I think that sometime in the future they'll produce even better work.)

To begin with, it's almost impossible to maintain the ideal steam condition within the ager. We have a superheated steam even before we begin work. The steam at the boiler has a pressure of anywhere from 70 to 100 pounds, which indicates a temperature of 315 to 340° F. As the steam is conveyed through the steam pipes, away from the boiler, and into the ager, its pressure drops steadily, but its temperature is still far above the desired point. When that steam enters into the water at the bottom of the ager, it is generally supposed that it causes the water to boil, and give off a saturated steam of 212° F. It *does* cause the water to boil, *but,* if the steam has any considerable pressure behind it, then the water level of the ager must be very high indeed, else the steam simply spurts through the water without becoming desuperheated. This, naturally, serves to increase the temperautre within the ager. Further, as the printed pieces continue through the steamer, the discharging hydro tends to generate heat. Add to this the fact that the cloth itself has a tendency to impede the free circulation of steam, and we have a fairly good idea as to the causes of these higher temperatures.

Now that we have determined the cause, at least in part, let us consider the cure. We can start by threading the piece through only every *other* roller in the ager. This gives us a capacity of only 80 yards in the box. Naturally, this allows a freer circulation of steam, and the steam does not become saturated with impurities so readily. This will help improve the quality of our work *but,* our production is reduced by half—and that won't do at all.

If our ager is sufficiently wide, we can remove part of the outer insulation. This will permit the escape of heat, at the same time causing condensation on the inside walls of the ager. The steamer, however, *must* be sufficiently wide to avoid the possibility of this condensation coming in contact with the piece.

Again, specially built-in fans may be set *inside* the ager at such an angle that they will keep the steam in constant, swirling, circulation, thus preventing the dead heat pockets of which we have already spoken.

Further, a series of atomizers may be used to inject a cool water spray into the ager. This spray will take up some of that excess heat, besides increasing the moisture content of the ager. *Extreme* care must be exercised, however, to insure against spits.

Just a few more items, and we'll have finished with ageing.

It has become the custom, especially in those print shops which do not have sufficient ageing facilities, to run *two* lines through the ager at the same time. The pieces are entered back to back so that one piece will not mark off on the other, and are run in the usual manner.

As we remarked before, the vat requires copious quantities of steam to reduce properly. In an atmosphere which is intended to be sufficient for the reduction of only *one* line, it is difficult to see how *two* lines can be expected to reduce in one run. On a small pattern, this plan works moderately well; but on a larger pattern, there is a definite difference in the reduction, and hence in the developed shade. Incidentally, I am told that a certain print shop here in town runs *six* lines in the ager, all at the same time. To which I can only say "I'd like to see their work."

Now these remarks which I have made, if considered individually may not mean much; but if we consider them as a whole, and act upon them, it *may* help to improve the quality of our work.

DISCUSSION

Chairman Freedman: Now, gentlemen, I will throw the meeting open to discussions on the papers just listened to. Are there any questions?

Mr. P. J. Wood: I have listened with a great deal of interest to both these papers, and I have enjoyed them very much. I always enjoy Phil Stott's papers. Mr. Blackman is a newcomer, in a way of speaking, and I must compliment him on the extremely practical nature of his paper. It is very rarely that we have the pleasure of

hearing from a practical man of his observations actually and directly from the mill.

He referred to the matter of standards as being a French method. I may be wrong in this and it may really be a French method, but I know it existed in England in 1865. However, it may have come over from France before that, when the natural colors—and I think Mr. Carter will bear me out in this—when the natural colors were in use. Even in my time they used some natural colors, and we do still in the way of reduced black, but in those days they used natural colors exclusively.

I have a book, by the way, which was given to me, and which was hand-written by some old chap in 1865. This book was given to me by Jacob Wolstonholme, who was my foreman printer. Jake brought this over from England with him from Potter's of Dinting Vale. I suppose many of you know Potter's of Dinting Vale. It was probably the largest print works they ever had in England. I think it may still be there today. They had 52 machines, which equals the Pacific Print Works in Lawrence. In this book he referred to standards of beechwood, madder, redwood, logwood, sapanwood, and a great many others, the names of which I have forgotten for the moment. Oh, yes, Persian berries was another favorite color, and as a matter of fact that is one of the natural colors that is even used today. They always referred to a standard first, and then to colors which were made up from that standard, i.e., so many light mixtures of that. It seems rather a complicated method, and it must have been a tremendous thing to keep track of all those, although in those days I don't believe they were called upon to make the variety of colors that we do today. However, it is quite likely that Mr. Carter may be able to shed a little more light on the matter of variety of colors which were produced at that time. I have seen some samples of his that are really astounding in view of the fact that they were limited to a comparatively small number of natural colors.

When Mr. Blackman was talking about glycerine as a hygroscopic agent, I wondered what his experience had been with diethylene glycol. I might say that I tried it both in the color and by padding the goods before printing as a means of giving sufficient moisture to the vat color to dissolve it and form for itself what I call a localized dye bath, which printing is really, after all, during the ageing process. However, maybe other people have had more success with it than I have had, but I must say that diethylene glycol for one thing was not as cheap as glycerine, and I didn't find it to be quite as effective, although I didn't make exhaustive experiments (only making a few) preferring to stick to the old method, which seemed to work very well.

A few weeks ago I happened to be having dinner with five cotton printers of national reputation in Providence, and I heard a very interesting remark. I don't know whether it is a secret, or whether I am upsetting somebody's plans, or not, but I was told that somebody had invented a very ingenious way of printing two patterns on one printing machine at the same time. I don't know how many have heard of it. It seems they use an eight or a ten-color, or even a twelve-color printing machine, and they run one pattern on the back of the machine, and another on the front of the machine. It sounds very revolutionary to me. I was even told that somebody had applied for a patent on the idea of doing that. In the one case the goods are run from the back of the machine down through the two or three nips and on down through the floor to the floor below where they are dried; whereas, the other is run from the front, up the front of the machine, and dried above. I must say it sounded revolutionary, and if it works it is a wonder. However, I think it is a pity for the printing industry because now, what we would like to have, is the requirement of two machines per pattern, and maybe the production would not be too much —

Mr. Stott: What about the NRA?

Mr. Wood: The NRA is a matter of hours I believe, and I suppose if you can get two hours' work on one machine in an hour there is nothing against that.

That struck me as being a very ingenious idea.

With regard to the developed colors referred to by Mr. Stott, we have been using developed colors in this District I think mainly on dark colors, navies, browns, blacks, and probably a few other colors, but I know of nobody here—of course it may be done—in this District who uses the developed colors for light and medium shades. It is, I think, the common practice to use direct colors, the faster direct colors, and perfectly dischargeable for the medium and light shades of course. However, I have heard that down East they are using developed colors even for the lightest shades: grays, tans, light blues and pinks. It is possible that somebody else may have something more to say on this subject which may disabuse my mind of the idea that this District is confining itself to direct colors for light shades.

I must say in closing again how much I have enjoyed these two papers. (Applause)

Chairman Freedman: Are there any further questions?

Dr. Harold DeWitt Smith: Mr. Chairman, I would like to ask either one or both of the speakers whether the recent introduction of pigment into the delusterants to make the dull yarns has had any effect on the discharging of some of these colors, or whether the pigment is so completely inert that it does not affect the discharge at all.

Chairman Freedman: Mr. Stott, would you care to answer Dr. Smith? I am calling on you because your paper was first presented.

Mr. Stott: I have not heard anything about that, Dr.

Smith. However, if my information as to the nature of the delusterant is correct, I wouldn't expect it to make any difference; as a matter of fact, I think it would be an asset, although I don't believe that I have any information practically on the subject.

Mr. Blackman: We have printed considerable yardage with these delustered yarns, and we have not yet run into any trouble from that source, except the colors are duller naturally than they would be on the bright yarn.

Mr. Stott: It is an accepted fact that the delustered yarns do not have as much of a finish as the bright rayons.

In regard to Mr. Wood's comment about the use of developed colors for dark shades, and the use of direct colors for correspondingly lighter shades, light and medium, I was much interested. Of course what Mr. Wood said is perfectly correct. There probably is no need to use developed colors for light and medium shades provided you select a direct color which has sufficient fastness to the subsequent wet processing not to bleed back into the white. I thought that I, perhaps, had not made that quite clear in my paper, and what Mr. Wood said is very true.

Chairman Freedman: Are there any further questions?

Mr. Schmidt: Since we have so many yarn men here, I want to give them a little problem to work on. I would like to know if any of the dyestuffs manufacturers can make a dye which is soluble in mineral oil in sufficient amount, and then the dye have the property, when cotton goods are treated with it, that the cotton will take the dye out of solution and thus dye the fabric. If anyone has any dye that will do that, I will be glad to have some information concerning it.

Chairman Freedman: Have you all heard the question, or do any of you want to have it repeated? Is that for printing or dyeing?

Mr. Schmidt: No, it is not for printing, it is for dyeing.

Chairman Freedman: Dyeing in oil, transferring the dye to the cotton fiber and producing a relatively fast dyed fabric is what you have in mind?

Mr. Schmidt: Yes.

Mr. Dougan: That would be quite a trick, Mr. Chairman, because there are plenty of dyestuffs soluble in mineral oil, the so-called class of oil soluble colors, but they are not what are known as substantive or the diazo or benzidine coupled group, therefore they have no affinity for cotton. The thing would be to get a substantive dyestuff which would be soluble in oil, and remove it from the oil when the cotton passes through. I presume he wants it for padding.

Mr. Schmidt: I understand the idea has been worked out, and a patent applied for. You are probably familiar with the oil-spraying of cotton to keep down the "fly" of the mill, and it may be worked out. I have seen cloth that has been made where the oil solution and dye were sprayed on the cotton, and the cloth came out a uniform shade. The only drawback was that the dyestuff was not fast. So it would do away with the dyeing of cotton goods by introducing the dyestuff with the oil spray.

Chairman Freedman: Are there any further questions?

Mr. Blackman, I wonder whether you would care to comment upon the relative values of glycerine and diethylene glycol in so far as the print work is concerned.

Mr. Blackman: We have made comparative tests both for money value and for effectiveness using diethylene glycol as against glycerine, which we use at present. We have tried varying quantities, and we don't get any better results with diethylene glycol than we get with glycerine. We get no greater reduction with diethylene glycol, and taking into consideration the fact that it is much more expensive, we think it best to continue in the old way and use glycerine.

Chairman Freedman: Thank you, Mr. Blackman.

Are there any further questions? There being none, I want to take this opportunity of thanking both Mr. Stott and Mr. Blackman for the very interesting papers this evening, and I am ready for a motion calling for a rising vote of thanks to the two speakers.

. . . The audience arose and applauded, after which there was an outline given by Mr. Herrmann and his assistants as to the plans that had been made for the forthcoming convention. . . .

. . . The meeting adjourned at ten o'clock. . . .

Calendar of Coming Events

Meeting, New York Section, Alexander Hamilton Hotel, Paterson, N. J., April 26, 1935

* * * *

Spring Meeting, Piedmont Section, Poinsett Hotel, Greenville, S. C., May 4, 1935

Proceedings of the American Association of Textile Chemists and Colorists

UNEMPLOYMENT REGISTER

Members of this association, who are without employment, should forward to the secretary a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the secretary any vacancies which may occur in their businesses.—H. C. Chapin, Secretary, Lowell Textile Institute, Lowell, Mass.

Key: A—Laboratory and research; B—Dyeing or printing; C --Finishing; D—Sales; E—Instruction; F—Executive

Note. Persons who have obtained employment should notify the secretary at once. Prospective employers may file vacancies either with the secretary or the American Dyestuff Reporter.

A-3

Education—Ph.B., Brown University, 1920. Two years post-graduate work at M.I.T.

Experience—2 years instructor at M.I.T. 2 years as research chemist in print works (Gum thickenings, application of dyes, dye testing and evaluation. 4 years as chief chemist in bleaching, mercerizing, dyeing and finishing plant. 4½ years as research and plant chemist in silk mills (Colorimetric work in color matching, dye testing and identification and testing of chemicals). 2 years as organic research chemist (laboratory and semi-plant research on organic chemicals, intermediates and dyestuffs). Age 35, married. Will go anywhere, references.

A-5

Education—B.T.C., Lowell Textile Institute.

Experience—Assistant chemist in carpet mill, dye tester in dye plant, research and analytical work in silk dyeing and finishing plant laboratory, plant chemist and overseer of bleaching in surgical dressing plant, assistant chemist in woolen mill. Age 29. Married.

A-6

Education—Analytical Chemistry and Dyeing Course, Lowell Textile Evening School.

Experience—Seven years as print color and dye chemist in printing, dyeing and finishing plants; recently in charge of textile printing department of dyestuff manufacturer.

A-8

Education—B.T.C., Lowell Textile Institute.

Experience—Assistant chemist in carpet mill, five years; dye testing, analytical and general mill control work. Age 29, married.

A-B-2

Education—Lowell Evening Textile School, 1917.

Experience—Five years' experience in hosiery dyeing, full fashioned hosiery of silk and cotton and silk, also men's hosiery containing rayon, wool, cotton and celanese. Several years experience in laboratory work. Has also had experience in jig-dyeing of cotton piece goods, slub and top dyeing.

A-B-4

Education—B.T.C. 1934, Lowell Textile Institute.

Experience—Assistant chemist in cotton knitting plant; second-hand in woolen knit goods dye house. Will go anywhere; references.

A-B-5

Education—Graduate of the University of Lausanne, Switzerland. Doctor's degree in Chemistry. Knowledge of French and German.

Experience—Eleven years with large bleaching, dyeing, printing and finishing plant as assistant Chemist and then Chemist in charge of the Laboratory. Experience in dyeing and printing cotton and rayon fabrics; research and analytical work.

A-B-C-1

Education—Graduate Industrial Chemical Engineer, Pratt Institute—1911.

Experience—One year as plant control chemist, 4 years as laboratory chemist with gas company, 13 years as plant chemist with bleaching, dyeing and finishing plant. (Rayon and cotton piece goods). Formulated processes and put them into plant operation, 1 year as chemist and demonstrator for dyestuff company, 1 year as superintendent colorist with print works printing linen and rayon, 1 year as director of testing laboratory for national dry goods concern.

A-B-C-2

Education—Graduate of Lewis Institute of Engineering of Chicago and graduate of Philadelphia Textile School (Chemistry and Dyeing department).

Experience—Has had extensive experience as assistant chemist and colorist in silk printing, dyeing and finishing; also dyeing raw stock wool; and dyeing and finishing cotton and rayon. Age 30; married; references.

A-B-C-3

Education—3 years at Brown University and Drexel Institute.

Experience—2½ years in dyestuff laboratory; 3 years as second-hand, dyeing indanthrene and direct colors on rayon skeins; 6 months as boss dyer on silk and cotton ribbons and hosiery; 3 years overseer of dyeing and finishing rayon tubing. Can handle laboratory, dyehouse, finishing or outside service. Age 30; married.

A-C-1

Education—4 years at Newark Evening Technical School in Chemical Engineering.

Experience—8 years in manufacturing, research, testing of soaps, oils, gums and finishes and application of same in all phases of the textile industry. Age 23, single. References.

A-E-1

Education—Ph.D., Univ. of Illinois, studied chemical engineering at Columbia, licensed chemical engineer, New Jersey.

Experience—10 years' experience teaching in colleges, subjects included chemical and textile subjects. Has had broad experience in industrial work including experience in testing materials, research and consulting. Will go anywhere; references.

B-1

Education—Educated and trained in chemistry and calico printing in Glasgow, Scotland.

Experience—Has been with large print works as colorist for 13 years producing first class work on cotton, rayon, wool and silk fabrics. References.

B-2

Experience—Boss dyer with one firm for 18 years, divisional supt. at print works for 1 year, in charge of processing and dyeing of cottons and rayons at large bleachery for 6 years. Prefers bleachery in East but will go anywhere. References.

B-3

Experience—Foreman piece dyer for the past 21 years. Can dye the following; celanese, rayon, cotton lacks, wool, silk and mixed fabrics. Has knowledge of finishing and laboratory work.

B-6

Education—Graduate R. I. School of Design.

Experience—5 years in bleachery, 7½ years as assistant dyer, 2 years as boss dyer and 3 years as superintendent of dyeing and finishing. Married, 33 years old. References.

B-7

Experience—Eight years as boss dyer on skeins and ribbons. Over ten years as chemist and head dyer for a large hosiery mill. Experienced on Silk, cotton, rayon and wool in skeins, ribbons, piece goods and all kinds of mixtures. Willing to go anywhere. Not afraid to work or face responsibility. Can handle help efficiently.

B-8

Education—Chemistry and Dyeing Department, Philadelphia Textile School.

Experience—Eleven years experience as chemist and boss dyer on the following: woolen, worsted and cotton yarn; woolen, worsted and union piece dyes on both ladies' and men's wear; wool, cotton, shoddy and mohair raw stock. Age 33, married, will go anywhere. References.

B-9

Experience—Hosiery dyer with fifteen years' experience on high grade silk hosiery; familiar with all types of machines. Age 43, married. Will go anywhere.

B-12

Education—2 years days at N. Y. U. and 3 years nights studying chemical engineering.

Experience—1½ years asst. colorist, 5½ years colorist. Experienced on vats, commercial and fast colors on cotton and cotton-rayon mixtures. References; age 29; married.

B-13

Experience—Large experience as an assistant colorist chemist in silk printing, dyeing and finishing; also on cotton and wool dyeing. References.

B-14

Education—Rhode Island School of Design.

Experience—Familiar with all classes of wool dyeing. Seven years with large carpet mill as dyer and processor of washed oriental rugs. Will go anywhere, married, 37 years old. References.

B-15

Education—B.T.C., Lowell Textile Institute, 1934.

Experience—Experience in dye house running washers, dye kettles and as a dye weighter.

B-16

Education—Chemistry and Dyeing Dept., Philadelphia Textile School.

Experience—Head dyer and chemist on all types of hosiery; dyeing silk, cotton, Bemberg, rayon and unions of same; Celanese and immunized cotton effects. Age 27, married. Will go anywhere.

B-17

Education—Lowell Textile Institute (Chemistry and Dyeing Course) 1916; extension courses at Brown University.

Experience—6 months dyeing wool at finishing company; 2½ years research work on bleaching, dyeing and finishing at dye works; inspector of textile equipment, U. S. Ordnance Dept., during war; 15 years as superintendent of dyeing at finishing company, including all types of colors on cotton piece goods and some rayon and celanese; handled chemical work at last named plant for many years as well as dyeing. Age 40, married, prefers East. References

Analytical Methods for a Textile Laboratory

The Council of the A.A.T.C.C., believing that Dr. Scott's series of articles entitled "Analytical Methods for a Textile Laboratory" might well be brought together in book form, have proceeded with its publication. Copies may be obtained from the Secretary of the Association, Harold C. Chapin, Lowell Textile Institute, Lowell, Mass., for 75 cents.

STANDARD SILK SAMPLES

There have been prepared, under the direction of the Sub-Committee on Fastness of Dyed Silk, standard dyed silk fabrics to represent four classes of fastness to washing—namely, Class I, Class II, Class III and Class IV. These standards have been carefully dyed with the dyestuffs and according to the dyeing methods recommended in the 1931 Year Book.

The A.A.T.C.C. is prepared to furnish sets of these washing standards for a nominal charge which will cover the cost of preparation. It will be possible to accurately grade the fastness by comparing it with the standards after subjection to the standard washing tests approved by this Association. All inquiries concerning these Silk Washing Standards may be addressed to the Chairman of the Research Committee.

Louis A. Olney,
Lowell Textile Institute,
Lowell, Massachusetts

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Published biweekly by
HOWES PUBLISHING CO., INC.
440 Fourth Avenue, New York City

A. P. HOWES, President
M. D. REESER, Secretary
H. F. CRAWFORD, Treasurer

Subscription price: $5.00 per year; Canadian $6.80 foreign $6.00

Vol. XXIV April 22, 1935 No. 8

HOW PRACTICAL IS A PRACTICAL MAN?

TECHNICALLY trained "practical" men undoubtedly think that they are just as practical as any man in the mill who is engaged in practical work but who has had no special training. They ought to deserve a rating of *more* practical, in the very best sense of that word. Hence it always seems queer when one of these technical men who is more or less closely connected with the production of some mills makes remarks tending to belittle scientists, research workers, research publications or even the technical literature of the trade. This is queer because he *is supposed to be practical.*

Let us start the discussion with the articles on textile operations and treatments which are presented from time to time in the trade press and often criticized because they are not practical enough. Does the critic write practical articles on his own line? If so he is the fortunate exception. As a rule most technical workers in textiles are not free to publish what they might wish to. Hence is there anything more practical than the fact that any other writer is probably no more free than the critic himself to discuss practical mill operations which are thought to have, and frequently do have, confidential features? No one can *expect* to find in the literature the type of material that he himself is not free to contribute. It is however, of some value to have the general principles of textile processes discussed from time to time even though such discussions cannot always be up to date, and it is for good practical reasons if such material is more or less censored or denatured before it can be printed.

When your technical man gets a good wordful title, perhaps with such magic terms as manager or engineer in it, the pride of the moment often seems to get the better of his good sense. For some strange reason he is likely to take the attitude that any data or suggestions that he cannot use right away for some practical purpose are not any good. Oh, that's theoretical, that doesn't mean anything, it's this production that counts. So it is. Production necessarily comes first as far as he is concerned, but the tendency seems to be, at times, to dismiss nearly all of the rest as of no particular value.

We have to overlook some of this attitude as propaganda or personal build-up and, incidentally, that is more easily seen through than those who practice it may imagine. However, discounting this factor, there is a certain amount of honest, although apparently unthinking, opinion that "theoretical" things do not amount to much.

This term theoretical undoubtedly connotes rather intangible flights of fancy such as we all know, but it is not limited to this sort of thing. A theory is just a temporary policy adopted for use while we are on the way to establishing some new fact. While theories may be adopted at times in place of facts when we lack them, such are usually recognizable as not having a complete basis in fact and, of course, no one needs to take them too seriously.

Now, looking at the great mass of scientific study and research applied to textiles and the general great advance in technic and understanding in the manufacture of textiles, you must admit that the tendency of what is so glibly described as theoretical has been toward a great improvement.

We freely admit that there are plenty of examples of unsound theory, research, and conclusions but we must also admit that the whole mass of such study represents an advance. We should question our own conclusions very carefully before declaring any piece of research to be worthless because many times something is brought out quite other than what was aimed at. It is, however, fair to consider whether some theories and projects are of more value than others and to criticize on that basis.

It must not be overlooked that much of the attempted application of science to textiles has to do with explaining and understanding the things both old and new that are going on. This may not be as spectacular, nor seem as valuable as the devising of new products and styles, but is it any less practical?

One who has studied and practiced both sides of the issue can only conclude that the "practical" man who disdains science is not very practical, and if he is a technically trained individual we would say that he is still worse, a sort of practical parasite who gets the benefit without even giving his moral support.

Pitted Needles and Sinkers*

By **B. L. HATHORNE**

Textile Consultant, and

GEORGE A. URLAUB

Louis Hirsch Textile Machines, Inc.

Question: You state that silk should be wound around needles and sinkers and placed into tightly corked test tubes. We feel that this does not give the same atmospheric conditions as are encountered in actual knitting. After one week's test our sinkers remain uncorroded. Have we tested properly? Will not water accelerate the test?

Answer: Our report did not mention the step by step procedure in making the ageing test of silk wound around new sinkers. Silk was treated in the same solution as in the mill and while in its wet state was wound around the sinkers.

Question: Would the addition of a little water in the test tube introduce any misleading factors?

Answer: A laboratory check of this question involving the use of the same sinkers, needles and chemicals as were originally used in the work that preceded the writing of the article clearly shows that the addition of a little water to the test tube does not introduce any misleading factors but also definitely accelerates the test.

Question: What quantity of silk should be wound around the needles or sinkers?

Answer: In our tests we used not over one hundred (100) turns around the needle or sinker to be tested—somewhat openly spaced so that bare metal shows in spots.

Question: A mill buying prepared silk cannot afford to hold it for weeks or months while awaiting the results of a test—is it not possible to accelerate the tests?

Answer: It is undoubtedly possible to accelerate the test to a point that will allow an accurate check up made within two or three days. Our work was not planned to evolve a method of test. We were seeking for facts that, when found, seemed sufficiently important to us to deserve publication.

While an accelerated test can be and undoubtedly will be worked out, we point out that it is not wise to trust accelerated tests until they have been proven to be safe by comparison with an actual performance test. This requires considerable time. Our work now under way along these lines will be published at a later date.

*Ed. Note: The publication of the article "Cause of Pitting of Full Fashioned Needles and Sinkers" (Hathorne and Urlaub) in our issue of October 22, 1934, aroused considerable discussion and the authors have prepared the following additional information to answer certain questions which were raised.

Question: Is it possible for a small quantity of silk wound about sinkers or needles to contain sufficient acid to actually dissolve a sinker as stated in your article?

Answer: Those sinkers that actually dissolved were immersed throat down in three-fourths of an inch of liquid in the bottom of a test tube. This liquid was identical with that actually applied to the yarn prior to throwing and that on the yarn wound around the sinkers.

Question: Does water enter into the problem as a major factor?

Answer: Yes, as we pointed out in a foot-note to our report. Water is a very important factor. We confined ourselves to a discussion of the effect of factors other than water.

Not only does water cause the trouble by itself, and accelerate the trouble in all instances, but variation in water causes the same chemicals to give entirely different results in different mills.

Space does not permit this phase of the trouble to be answered in detail here.

Question: Do needle oils sometimes cause corrosion of needles and sinkers?

Answer: We can only speak with authority concerning those we tested which were being used by the mills which encountered pitting troubles. In all those cases the needle oils were found satisfactory.

Question: Can the trouble be caused by the silk itself?

Answer: It is theoretically possible for silk to cause such trouble since sericin contains some acid radicals. Our work has not included a detailed study of this phase of the problem. On the other hand, we have no evidence that silk of itself does cause the trouble. This angle of the problem requires further investigation.

(All rights reserved)

Dyeing of Hosiery*

By L. THERN

ONE of the most difficult special tasks of textile dyeing is the dyeing of hosiery. Because of the unusually high demands which the buyer is now accustomed to impose upon the quality of hose, the slightest errors in manufacture lead to trouble and complaints, and it is, in more than one case, almost impossible to satisfy completely all the demands which may be made as to quality. It may, then, be of interest to speak of a few matters involved in the question of hosiery dyeing.

While, not so very long ago, only the simplest sort of wool and of cotton hose was worn, most hose today are made of rayon with cotton, rayon with wool, silk with cotton, and other such mixed materials; and it is only through the use of the newest brands of rayon, and the various dull-lustered artificial silks, that it is today possible to produce elegant hosiery which satisfies modern standards. In all cases, the use of mixed fibers has essentially increased our difficulties in the dyeing of stockings.

The sort of hosiery most generally manufactured by us consists of artificial silk for body, with a cotton top, foot, and heel; and as this type presents typical difficulties in dyeing, it will be the one considered by us in this general discussion of hosiery dyeing.

In the choice of the raw material to be worked up, one has to pay careful attention to the securing of uniform material, for even slight differences in the number and twist of the yarn will lead to unevenness in the dyeing. It is also recommended that mercerized cotton be the fiber used in combination with the rayon, for mercerized cotton stands very close to rayon in its behavior toward dyestuffs; a point worth considering, for in the working up of grades of cotton of a lower value, which take up the dyestuff badly, it is, for dyeing mixed weaves in the darker tones, usually impossible to attain a good "tone-in-tone dyeing" (uniform dyeing of two or more different fibers in the same fabric). For lighter tones, in which the rayon shows less affinity for the dyestuff than does the cotton, the use of unmercerized cotton is of course to be recommended.

Before dyeing, the goods must be cleansed very carefully from the adherent impurities, oils, grease, etc. The bath contains, beside soap, some fat-solvent, and also, in case of hard water, some softening agent. For light tones, there commonly follows a bleach, in order to brighten up the cotton somewhat. We bleach for 15-30 minutes with a liquor of about 1 g. of active chlorine per liter. The goods are then rinsed, soured off, rinsed again, and finally dyed.

Dyeing is carried out either in the open tub, or in special hose-dyeing machines. In the open tub method, the separate hose are "tacked" (threaded) together at the tips, the bundles hung upon rods, and thus worked about in the bath. Machines have been constructed to work after the same principle; in them, for example, the loaded rods are laid into rectangular frames, and these frames thus loaded are given a reciprocating, back-and-forth movement by suitable mechanism, so that a good dyeing-through is possible. Other machines work upon the principle of washing machines (drum type). The drum, which is divided into three or four perforated compartments, rotates in the dye-liquor when closed and in operation. The goods are either placed loose in the compartments, or, for protection from mechanical damage from movement upon the metal surfaces of the apparatus, packed into nets, and these placed in the compartments of the drum. This type of machine also makes possible a simple method of working, and gives good, level dyeings, and, because of the high temperature of the bath, an easy penetration and perfect dyeing through of the seams. There are also machines of the rotating drum-wheel type, into the circumferences of which drums the rods bearing the bundles of stockings tacked together are set. All modern machines for the purpose, of any type, are built today of resistant metal, and guarantee a protective handling of the sensitive, fragile, rayon hose worked in them. Dyeing by the pack-system, which is still carried out frequently for cheap cotton hose in dark tones, is not possible for goods of artificial silk, since with this apparatus a level dyeing with through-dyed seams can hardly be attained.

As to the dyestuffs used for dyeing of hosiery, the following requirements must be met:

(a)—Good tone-in-tone dyeing between the rayon and cotton portions of the stocking;

(b)—as complete dyeing-through of the seams as possible;

(c)—fastness properties, especially as to light, water, washing, and brightening or scrooping, must satisfy practical demands;

* Translated from Melliand's Textil-Berichte 16,194 (1935)

(d)—effects in resisted cotton or acetate rayon should be tinted as little as possible;

(e)—the dyestuffs must be stable toward a boiling of considerable duration;

(f)—with hose of matte (delustered) rayon, the dyestuffs must be tested for suitability for this fiber also.

The question of getting a good tone-in-tone dyeing upon rayon and cotton forms a special problem, which cannot be taken up in this paper. It may merely be mentioned, that many of the dyestuffs which give the most level dyeings are not suited for hosiery dyeing, because of their only fair fastness to water. With such dyestuffs, if they must be used, an improvement of the fastness of the dyeings to water can be gained, under some circumstances, only by after-treatment with a suitable agent.

Dyeing-through often presents unusual difficulties, through the seams becoming very dense and impervious because of the swelling of the rayon fiber. The dyestuffs which penetrate best in ordinary dyeing can often not be used, because of their insufficient fastness toward water and washing. Often, one simply has to depend upon a very hot, even boiling bath to insure true penetration.

For the best results in dyeing completely through, the bath should contain as little salt as possible, and a penetrating agent should be added also. Only when a deep tone is being sought should a little salt (5 to 10%) be added, and then only in small, successive portions. For favoring level dyeings an assistant is recommended; especially when the water is hard should an assistant be used, and soap omitted from the bath.

Corresponding to the manifold requirements imposed upon hosiery dyeing, choice should be made of substantive dyestuffs, which have been exhaustively tested for suitability for the purpose. For blacks, one uses the diazo dyestuffs which are fast to washing.

As a result of the long boiling necessary in hosiery dyeing, in many cases, with some dyestuffs, a certain decomposition or destruction of the dyestuff is observed during the dyeing, which is called the "boiling off" of the dyestuff. A product suitable for hosiery dyeing, one which will not boil off, has been specially sought after among the grays. In a new dyestuff we have a gray available, which, besides a good tone-in-tone dyeing behavior, and very good fastness properties, also displays complete resistance toward decomposition by long boiling of the bath, and, in contrast to the corresponding black which also is proof against boiling-off, is also suited for delustered rayons. The dyestuff is without doubt a very valuable addition to the list of desirable colors for hosiery.

Hose made of matte-lustered rayon are dyed in the same way as goods made from the ordinary, lustrous fiber. However, in choosing the dyestuffs, attention must be directed to the fact that some dyestuffs, which in other respects are satisfactory, give dyeings upon fibers containing titanium compounds, which possess only a very poor fastness to light while wet. If such dyeings (e. g., in light mode-tones) are exposed to sunlight in the wet state for only a very short time, the color is completely destroyed. This occurs, to be sure, with only certain dyestuffs (and naturally most evidently in the case of very light dyeings), and only with hose produced from fiber which has been delustered with titanium compounds. However, there are available sufficient dyestuffs which are perfectly satisfactory for such a fiber.

In order to give the goods a better scroop, they are brightened after dyeing. The so-called crackle scroop can be imparted best through a treatment with 1-2 g. of lactic acid per liter, in the bath or with other trade products. There are a number of products now on the market designed to produce a soft scroop which may be applied in the dyebath.

The goods after dyeing are carefully packed into the centrifuge and carefully run through. It is important that the goods acquire no breaks in the process, as broken fibers are difficult to mend. Afterward, the stockings are either dried, and then brought to shape, after being slightly dampened, upon wooden or metal forms, or they may be placed upon the forms while still wet from the centrifuging. They are now-a-days usually shaped upon electrically heated metal forms, which assure the maintenance of a uniform and correct temperature, and expose the goods to less risk of mechanical damage than do wooden forms. With this stage over, the dyer's work is ended.

The dyeing of cotton hose is carried through with the same viewpoints in mind as with the dyeing of rayon-cotton hosiery, only the difficulties of tone-in-tone dyeing, the dyeing-through of seams, and the tenderness of the artificial silk material in the wet state do not occur. Beside the otherwise customary substantive and diazo dyestuffs, dark tones, especially blacks, are also dyed with Immedial colors (e. g., Immedial Carbon B). Since cotton hosiery is mostly fabricated from mercerized cotton, much emphasis must be laid upon a very careful and uniform mercerization of the yarn, for most difficulties in the working-up of cotton hose owe their origin to irregularities in mercerization.

Stockings of rayon and wool are usually dyed in a single bath with half-wool dyestuffs. There are a number of such dyes on the market. We dye with the addition of 1-2% of proper assistant and a little salt, and can attain easily a good tone-in-tone dyeing through regulation of the temperature, and through addition, after entering the goods, of acid or substantive dyestuffs which go on well from a bath containing soap. At the boil, these dyestuffs go on more strongly upon the wool, and, at a lower temperature, more strongly upon the cotton. As compared to the often-employed two-bath method (acid predyeing of the wool, and subsequent overdyeing of the rayon), the one-bath method has the advantage of essentially more easy working, simpler problems in shading, and better dyeing through of the seams, so that even the disadvantage of a slight degrading of the feel of the wool is hardly to be taken into account.

Hosiery of natural silk with cotton felt are likewise dyed by the single-bath method, with 1-2% of an assistant or 5-10% of Marseilles soap, and 5-10% of Glauber salt

as additions. Oftentimes we dye simultaneously with the boiling-off process, in a neutral bast-soap bath. For such a dyeing, substantive dyestuffs are combined with acid dyestuffs which dye well from a neutral bath, of which there are a number found favorable. For blacks, we use the diazo dyestuffs and perhaps shade with another color.

● GENERAL RELEASES

The General Dyestuff Corporation announces release of circulars on the following products. Copies are obtainable on request.

Neutral Dyed Colors on Weighted Silk—a pattern card illustrating a selection of silk dyestuffs which are said to exhaust well on weighted silk when dyed from a neutral or slightly alkaline bath. Thirty-five colors are shown in three depths on piece goods and some mixtures are also shown.

Fastusol Orange L 7 G A—a bright, yellowish direct orange said to be of very superior fastness to light, which is recommended by the manufacturers for dyeing cotton and rayon.

Fastusol Yellow L R A Extra—a direct color said to be of very good fastness to light and comparatively good fastness to washing, which produces very clear shades on cotton and rayon. It is further said to leave both silk and acetate clear white and discharge easily.

Ramasit A—an assistant containing a high content of finely dispersed paraffin for treating and processing of cotton, rayon and other vegetable fibers which makes possible the use of paraffin in conjunction with the size because it is said to have good emulsifying and dispersing properties. Treated goods are said to have a very supple handle and to be excellently suited for further processing. Directions for application and uses are given.

Diazo Brilliant 2 B L A Extra Conc.—a product, which, with beta naphthol is said to produce on cotton and rayon full shades of a wash-fast, bluish scarlet.

Fast Garnet Salt G C—the stable fast color salt of Fast Garnet G C Base which is one-fifth the strength of this and is said to produce shades of equal properties.

● AMERICAN BEMBERG PROMOTION

Announcement is made of the appointment of Theodore Wood to succeed Ernest C. Morse as advertising manager in charge of promotion for the American Bemberg Corp. Mr. Morse has resigned to join the Associated Wool Industries as general director. Assisting Mr. Wood will be H. Z. Heuston.

● TURBO-MIXER MOVES

On and after May 1st the new address of the Turbo-Mixer Corp., specialists on mixing and agitating equipment, will be 247 Park Avenue, New York, N. Y.

A CONTROVERSY OVER HOSIERY DYEING

(Continued from page 210)

One and all were hoping and praying the dull finish craze would be just a passing fad that would soon blow over. But it persisted, in fact it kept growing steadier until it became evident that silk hosiery all had to be de-lustered in order to sell over the counter. Dyers had to struggle and keep on trying until a de-lusterer could be found that would work without bad effects. It looked like none had the least notion to look for the solution in the right direction, but all had to do the best they could to get by.

A FORTUNATE ONE FOUND AT LAST

Among the dyers I visited was a young man who had been my assistant for a number of years and was now in charge of the dyeing and finishing in a new mill. Having had his training as a dyer with me naturally he was doing his dyeing in an acid bath and doing quite well with his job. When I asked him how he was doing his delustering and what his results were he said he had started with barium sulfate made into a paste with sulfonated castor oil as he had seen it done when he was still with me. Later he had found a prepared dull finish that was easily kept in solution and had adapted it. It worked well from the start so he was using it right along. He had heard of all the troubles other mills were having with the dull finishes, but he had had no complaints to speak of.

"Well, Joe, what do you think is the matter with the others, who are having such a hard time with de-lustering?" I asked him.

"If you want my opinion" he said, "I believe that their troubles can be laid to methods they use in dyeing their hosiery. When dyed in an acid bath the goods come out thoroughly clean. No soap or de-gumming material is left on them to react with the de-lusterer and mar the appearance of the fabric. If they would learn to wash the dyed hsoiery clean from all that, before they attempt to put the dull finish on it, maybe they will be able to do a good job of de-lustering. The acetic acid we put in the dyebath does a thorough job of neutralizing our hosiery and prepares a clean ground for anything we want to put on it afterward. To my mind that is the whole secret. You and I are working exactly the same way and, from all accounts, are the only ones that get good results where the rest of the fraternity is continually in hot water."

"Joe, that is just what I believe too."

Aside from the fact that when working over a clean surface the dull finish goes on level, without giving any trouble, the ground is also prepared to absorb evenly any amount of sizing to make the hosiery firm, with a full hand and as soft as desired. This means a whole lot, especially when the dyer has to work on goods that are loosely knitted, full of sleaziness and knitting defects. When a lot of sizing can be put on the hosiery without showing any bad effects a number of imperfections can be smoothed out of the hosiery, which otherwise would have to be sold at a discount.

Remarks Upon the

Finishing of Rayon and Silk Hosiery*

By **W. KEGEL**

WHEN the stockings have left the dyehouse, they are not yet ready for sale. Various treatments are still necessary, in order to impart to them an attractive appearance which will promote an easy sale; and these necessary treatments are the task of the finisher. The production of the desired silky scroop in some cases is combined with the process of dyeing. It depends upon the precipitation of fatty acids upon the goods, which is brought about by successive treatment with soap and with acid. Even though the fundamental chemistry involved in the production of the scroop is in no way yet cleared up, we can, however, assume that it is only a question of depositing a fatty acid upon the surface of the fiber, which (the acid) in its microcrystalline state imparts a rough superstratum to the fiber, through which the crackly, silklike scroop is produced. Usually, we dye the hose with substantive dyestuffs from a soap-bath, on leaving which, without rinsing, the goods are immediately soured. If one dyes the hose with substantive dyestuffs from a Glauber's salt bath, or with sulfur dyestuffs, then, to give the goods the necessary scroop, they must be soaped and then soured without intermediate rinsing.

As simple as this production of the scroop upon hosiery appears, it nevertheless requires much care and experience, if mishaps and damage are to be avoided. Even the choice of the dyestuff plays an important part. If one dyes from a soap-bath, care has to be taken that such dyestuffs are used as will bear a souring of the goods dyed with them, without change in the tone or shade. The same holds good for dyeings which are carried out in Glaubers salt baths, and afterward soaped and soured. In the latter case, the shade must be resistant to both soaping and souring. The same thing holds good also for hose dyed with sulfur colors. And the choice of the acid used for souring also plays a certain part.

In general, the fact that even organic acids, under some circumstances, are able to cause tendering in cotton or rayon goods, has been too little recognized, in practical circles. It is not intended to discuss this question here in a full or exact way, but it may be said that, in any case, after soaping, either lactic or formic acids should be used for souring, the goods being thus given a good, durable scroop, without harm to the material. The scroop becomes evident only upon drying of the goods. For the drying, care must be taken that the process does not last too long, nor go on at too high a temperature, since otherwise the shade as well as the scroop may be influenced.

The first treatment of the finishing process consists in the inspection and return of damaged pieces. They are examined for any kind of mechanical defect, repaired if possible, and sorted according to size. The next step consists in the shaping and pressing of the stockings. While, formerly, the hose, dampened, or wetted out and centrifuged, were drawn over wooden forms and packed into special drying chambers, the so-called forming-ovens, the industry today has gone over to electrically-heated metal forms, which certainly make possible a more certain and rapid and more uniform method of working. The drawing of the stockings upon the forms must be performed by experienced workers. Care has to be taken that the lengths are even, and that the hems and seams are not drawn out of shape and line. Too long a time in the drying ovens or upon the hot metal forms can induce damage in various ways.

The shade of the dyeings is altered by the forms being carelessly overheated, and it may also occur that the hose suffer in durability in storage, as a result of too long a time upon the forms under heat. In such cases, one speaks of the hose as "burnt in shaping." Even though stockings shaped up irregularly can be reformed into shape, such a process always involves a loss of labor and time, for such hose have to be softened (wetted out), centrifuged, drawn over the forms, and hot-dried again, which all in no wise adds to improvement of appearance or quality of finished goods.

All of these circumstances just mentioned can easily be mastered through the use of apparatus available today, under various more or less significant names. Such apparatus assures advantageous characteristics for the hose of artificial silk, especially matte-silk goods, natural silk, or wool, worked up by its means. The natural feel or scroop of the goods, the breaking-strength, the elasticity, are all retained, and any change in shade of dyeings is impossible. The temperature of the forms (12 to 32 on

* Translated from Monats. f. Textil-Industrie 50,44 (1935)

the present types) can be raised or lowered as desired. They require only skilled labor for their operation, to give the best results.

In comparison with wool, silk endures higher temperatures without being damaged. In conditioning, for example, one dries the silk at temperatures up to 105° C., and still can observe no evidence of decomposition or loss of strength of the fiber. Only at still higher temperatures does any decomposition of the silk set in, and then it is rapid and unmistakable. But even though the raw silk can endure fairly high temperatures without harm, still, its resistance to high temperatures is diminished by the various finishing-processes to which it has been already subjected, which in most cases involve progressive degrees of weighting, beside boiling-off and dyeing. In addition, even the otherwise harmless organic acids, which are used for brightening the dyeing, always exert a certain harmful influence upon the physical properties of the fiber when the goods still containing them are subjected to heat. Even though these organic acids are mostly volatilized by the heat, yet some always remains in the fiber, to exert a deteriorative influence.

Consideration of these points is of the greatest importance for the forming of natural silk hose, since at times highly weighted silk is used for such articles, which, as any other sort, will have to be exposed to fairly high temperatures while being formed. In this case it is not alone the elevation of temperature which brings about tendering of the fiber, but also an over-long drying of the articles, which causes tendering, because the silk will have become thoroughly dried out, and so have lost the normal moisture content, about 11%. The silk thereby becomes brittle and less elastic, which is the point upon which the durability of the stocking depends. Even the weighting process alone weakens the fiber to an appreciable extent, especially when the weighting goes up over what are generally accepted normal percentages; and, beside this, the weighting will not always have been carried out properly. In such cases, the silk will have been damaged even before it comes to the knitting.

If, now, the hose made from already damaged silk is formed at temperatures above 95° C. for an unnecessary length of time, on heated forms or in the forming-oven, damage may proceed so much farther that the goods must be rejected as ruined. The value of pure silk goods demands the greatest care that the silk be not too vigorously brightened, and not exposed too long to temperatures beyond the limit of safety. These points are too important not to deserve very special attention.

The forms, too, are of different kinds. It should be remarked, that the drying with indirect heat is safest. Beside wooden forms, those of aluminum have come widely into use, and these, too, in frame or full form. The feet of the forms are interchangeable in five different sizes. No joints are necessary, since the metal forms are only from four to five mm. in thickness, and so can be stamped out in one piece. Repairs are seldom or never necessary for such forms.

Indirect heating is cheaper by half than direct heating. The space required and the cost of operation of such apparatus is low, and stand in no significant relation to their output.

After forming follows the pressing. For this purpose, the formed stockings are subjected to hot pressure between smooth, glossy press-boards in a hydraulic press, to improve the luster and general appearance. Too long or too heavy pressure is not to be recommended, nor should the temperature be too high. After pressing, the stockings are folded to standard length for boxing ("broken"), and packed six pairs to a carton.

Finally, local alteration of the colortone of the packed hose should be mentioned; an alteration due to the use of cardboard boxes made with the use of pastes preserved with formaldehyde. The formaldehyde, usually employed as a preservative for the pastes in the box factories, volatilizes only very slowly (though the pasted boxes may have been completely dry for a long period), and, if the hose packed in such boxes are stored in a warm place, its volatilization may lead to alteration of the color-tone, if the dyestuffs used are sensitive to formaldehyde; the goods become unsalable. In this case, the hose can be brought again into a salable condition only by re-dyeing, to darker tones, or even to black.

The writer has also met with cases in which, by storage of the goods packed in white lining-paper containing small amounts of acids, the hose have become spotted and unsalable. A re-dying of such ruined hose is not only very costly in reference to the time and trouble expended, but the quality is in no wise improved, but really lowered.

The Howes Publishing Co.

is occupying
Booths 131-32, 159-60
at the
Knitting Arts Exhibition

Representatives of the
American Dyestuff Reporter
will be in attendance

Copies of
Knit Goods Weekly
Daily Show Issues
are available at these booths

Thirty-First Annual

Knitting Arts Exhibition

THE Knitting Arts Exhibition is being held for the thirty-first time during this week at the Commercial Museum at Philadelphia. Hundreds of manufacturers of knitting, dyeing and drying machines and allied chemical products and mill supplies will exhibit their latest products. It represents an opportunity to make comparisons of the different products all at one time. Among the exhibits which we think will be of special interest to the readers of this journal are the following:

THE J. B. FORD COMPANY
Wyandotte, Michigan
Booth 291

The full line of Wyandotte textile alkalies will be shown and two new products, Wyandotte Wool Scouring Special and Wyandotte Break Powder, will be featured. *In attendance*:—F. E. KLEBART, J. F. FLAHERTY, J. W. TURNER AND H. E. MOYER.

AMERICAN ANILINE & EXTRACT CO., INC.
Philadelphia, Pa.
Booth 219

This booth will be used for reception purposes. *In attendance*:—A. B. MCCARTY, THOMAS P. KEY, F. A. CARSTEN, JR. AND H. H. KIRKPATRICK. The Canadian Aniline & Extract Co., Ltd., of Hamilton, Ontario, will be represented by W. P. GUDGEON.

H. W. BUTTERWORTH SONS CO.
Philadelphia, Pa.
Booths 58, 59 and 60

The new Tube-Tex high speed steaming and finishing machine designed expressly for tubular knitted fabrics will be featured at this exhibit. *In attendance*:—J. E. BUTTERWORTH, H. W. BUTTERWORTH, JR., DE HAVEN BUTTERWORTH, A. MOLTE, W. E. H. BELL AND H. LOUNSBURY.

THE INTERNATIONAL NICKEL CO., INC.
New York, N. Y.
Booths 13 and 14

Mill and fabricated forms of Monel Metal for use in textile plants and dyehouses will be featured at this exhibit. Nickel Clad Steel equipment will also be shown. Visitors having metal problems involving resistance to corrosion are invited to submit such problems. *In attendance*:—C. J. BIANOWICZ, E. A. TURNER, F. L. LA QUE AND F. R. BAILEY.

THE PHILADELPHIA DRYING MACHINERY CO., INC.
Philadelphia, Pa.
Booth 182

This exhibit will consist of illustrations of the company's latest improved drying machinery for raw stock, skeins, warp yarns, hosiery, underwear, toweling and piece goods. Tenter dryers, carbonizing equipment and vacuum extractors will also be illustrated. *In attendance*:—W. W. SIBSON, H. O. KAUFMANN AND C. H. REUMANN.

GRAND RAPIDS TEXTILE MACHINERY CO., INC.
Grand Rapids, Mich.
Booths 129, 161 and 162

In addition to two new machines, the Roto-Press and the improved General Upright Finisher II, which are of interest to underwear and outerwear manufacturers, there will also be exhibited two all-metal scouring, fulling and dyeing machines and an extractor loader and unloader. *In attendance*:—W. H. SHIELDS, W. F. MOON AND A. STORMZAND.

BAUSCH & LOMB OPTICAL CO.
Rochester, N. Y.
Booth 371

The B & L line of optical equipment designed for use in the textile field will be shown. A new textile projector, designed to magnify, project and photograph knitted fabrics will be featured. *In attendance*:—W. H. SLOCUM, E. S. BISSELL AND J. I. WEXLIN.

JACQUES WOLF & CO.
Passaic, N. J.
Booth 350

The well known textile specialties of this company will be exhibited as well as the more recent additions to this line. Delustre S-342 E, Dull FinishW-716 and Dull Finish W-8-5 which are freely suspending pastes for delustering all types of hosiery will be shown. Waterproof-W-559 will also be exhibited. This product is said to give to the dyer and finisher of hosiery and yarns a simple process for spotproofing, rainproofing shower-proofing and waterproofing. *In attendance*:—F. G. HINCKEL, (Philadelphia representative), G. J. DESMOND (secretary and sales manager), and ARNOLD PFISTER (plant superintendent).

SCHOLLER BROTHERS, INC.
Philadelphia, Pa.
Booths 187 and 188

A complete line of soaps, softeners, sulfonated oils, finishes, etc. for textiles together with samples of material treated with same will be shown at this booth. Special stress will be laid on the highly repellent, spot-proof, low luster finishes for hosiery, silks, rayons, etc. *In attendance*:—F. C. SCHOLLER, L. M. BOYD, J. F. NOBLE, GEO. PICKERING AND E. S. ATKINSON.

ROCHESTER ENGINEERING & CENTRIFUGAL CORP.
Rochester, N. Y.
Booths 223 and 224

The following machines will be exhibited: 30 x 20" Super Dyeing Machine, 30 x 36" Super Dyeing Machine, 17" Monex Extractor and a 40" O-T Extractor. *In attendance*:—R. C. CAINE (general sales manager), C. F. FISCHER (Eastern representative), R. S. SHAFFER (Southern representative) and H. C. REMBOLD (Midwest representative).

W. F. FANCOURT & CO., INC.
Philadelphia, Pa.
Booth 185

Textile soaps, oils and specialties will be shown and will feature dyeing, degumming and delustering agents as well as oils for conditioning silk and rayon. Two new products will be shown: "Fanco" Aquapel—a new splash-proof or water repellent product said to be of great stability and "Fanco" Regenasol D-82—a chemical which is said to have the property of preventing and redissolving the formation of lime and most metal soaps. *In attendance*:—W. F. FANCOURT, JR., W. F. FANCOURT III AND CHARLES T. HARVEY.

LAUREL SOAP MANUFACTURING CO., INC.
Philadelphia, Pa.
Booth 181

Booth will be used for reception purposes. *In attendance*:—A. HENRY GAEDE (Southern representative), CHARLES E. HAGELGANS, E. W. SEASONGOOD AND WILLIAM H. BERTOLET, JR.

WARWICK CHEMICAL CO.
West Warwick, R. I.
Booth 378

Finishing compounds and throwing oils will be shown. Featured will be Impregnole, Warwick's shower-proofing agent. *In attendance*:—DALE S. CHAMBERLIN.

SMITH, DRUM & CO.
Philadelphia, Pa.
Booths 23, 24, 25, 26, 27, 28, 29 and 30

The Butterworth line of hosiery dyeing and skein dyeing equipment will be featured. A hosiery inspection form a double sole thread cutter will also be shown. *In attendance*:—HARRY S. DRUM, W. C. DODSON, R. D. HOWERTON AND J. E. MACDOUGALL.

NEVA-WET CORPORATION OF AMERICA, INC.
New York, N. Y.
Booth 166

This exhibit will feature "Neva-Wet", a process which is said to render fabrics of every type water repellent, spot resistant, perspiration proof and, in the case of woolens, also moth proof. *In attendance*:—MRS. GUENTHER A. FRANK.

W. H. & F. JORDAN, JR., MANUFACTURING CO.
Philadelphia, Pa.
Booth 133

This exhibit will consist of textile oils, textile soaps, special softeners and several new products including Duosolve Grains and Neolith. Insecticides and disinfectants will also be shown. Samples of fabrics and yarns processed with the above materials will be on display. *In attendance*:—CANFIELD JORDAN (president), HAROLD B. DOHNER (treasurer and Chemist), WILLIAM A. STRINGFELLOW (Philadelphia representative) and GEORGE C. HARKINS (Specialty representative).

O. F. ZURN CO.
QUAKER CITY CHEMICAL CO.
Philadelphia, Pa.
Booths 173-174

The usual line of specialties for the knit goods trade will be on display. *In attendance*:—JOHN L. WILSON, CHARLES J. CURRAN, O. F. ZURN, O. F. ZURN, JR., A. WINSER AND ROBERT SMITH. There will be a number of others present also including all of the Southern representatives, Canadian representatives and Philadelphia representatives.

CRUCIBLE STEEL COMPANY OF AMERICA
New York, N. Y.
Booth 363

Bars, sheets, and plates of various types made of Stainless Steel will be shown. *In attendance*:—D. K. MILLER (Philadelphia), S. H. REYNOLDS (Atlanta) and A. F. MACCLEAN (Boston).

THE PROCTER & GAMBLE DISTRIBUTING CO.
Cincinnati, Ohio
Booth 172

A specially featured exhibit will be the use of Olate Flakes in the manufacture of silk and rayon hosiery and knit goods from the raw silk to the finished product. *In attendance*:—E. M. KELLY, G. H. BEST, W. W. BRAY, W. B. TUCKER, J. B. CROWE AND H. H. BESUDEN.

ONYX OIL & CHEMICAL CO.
Jersey City, N. J.
Booth 358

Samples of processing and finishing compounds used in boiling-off, dyeing, dulling, spotproofing and finishing of hosiery and underwear will be shown as well as samples of fabric processed with these compounds. *In at-*

tendance:—J. W. Huber, E. A. Brick, L. P. Brick, C. E. Maher, E. W. Klumph and C. F. Ehrengart.

THE PERMUTIT CO.
New York, N. Y.
Booth 365

Super-Zeo-Dur will be featured at this booth as well as other machines for water softening and treatment. Samples of activated carbon and the zeolites, Decalso and Zeo-Dur will be displayed. *In attendance*:—M. F. Corin, D. J. Hess, G. A. Weinhold and W. L. Lowrie.

THE EWING-THOMAS CORP.
Chester, Pa.
Booth 33

Metro-Shade yarns developed by the corporation and exhibited for the first time this year at the Exhibition are said to make available to the knitting trades mercerized yarns processed to control dye affinity. *In attendance*:—Moses Ewing, Henry A. Spafford, David Thomas and Joseph J. Klumpp. George Ellis and Henry Crumbliss of Canon Mills, selling agents for the Ewing-Thomas Corp. will also be present.

● ARABOL MANUFACTURING COMPANY
1885-1935

June 1935 marks the end of the first half century of activity for The Arabol Manufacturing Company, manufacturers of adhesives, sizing, finishing, softening and weighting compounds. It was in June 1885 that Messrs. Jungbluth and Weingartner started the manufacture of adhesive pastes from cereals—adhesives that could be used without soaking and cooking and which would be free from the objectionable odors of animal glues. A small space was secured at East 9th Street in New York City for manufacturing purposes and a sales office was opened at 13 Gold Street. The acceptance of the adhesive products appeared to be unanimous and the demand grew steadily.

It soon became necessary to expand and larger quarters were taken on West 52nd Street and, with Edward Weingartner as president, the business flourished. A short time after still more space was needed and the present plant in Brooklyn was purchased and the business office was moved from Gold Street to 100 William Street, later being transferred to the present headquarters at 110 East 42nd Street. Arabol products increased in popularity and sales offices were opened in Chicago and in New Orleans. To meet the changes which were then taking place in the textile wet processing field, a complete line of sizing and finishing compounds was developed to add to the line of adhesives. Later, a manufacturing plant was built in Chicago and warehouses and offices were opened in Boston, Philadelphia, San Francisco, Seattle and New Orleans.

The creation of an export department necessitated the opening of offices in London and sales representatives were installed in many other countries. Textile products are handled by a special unit which is under the management of John J. Sokolinski, who is well known to the readers of this journal as an officer of the New York Section of the American Association of Textile Chemists and Colorists and as the author of several papers which have been published in the Proceedings of this Association.

Millions of pounds of Arabol products are now being produced annually and include several hundred varieties of gums, glues, pastes, starches and sizings which are used on cartridges, cosmetics, books, bottles, trunks, textiles, etc. and by anyone from a steel manufacturer to an artificial flower manufacturer. A complete staff of research workers are continually seeking new products and new uses for old products. An accurate and continuous control of all raw materials and finished products is said to be exercised to insure the maintenance of Arabol's slogan—"A Tradition of Quality."

Edward Weingartner remained as president of the company until the time of his death in 1917 when his widow Mrs. L. M. Weingartner was elected to that office which position she continues to hold. A. F. Voigt, vice-president, is celebrating his 50th year of service for the company and Henry Kohler, a nephew of the late Edward Weingartner is secretary and treasurer.

Recent developments of the Arabol Mfg. Company include the establishment of a Consumers Package Department to fill the demand for adhesives in small containers for school, office and home use and the completion of plans for the construction of a factory in San Francisco.

Acknowledgement is made by the officers and personnel of the company of the friendly business relations which have made possible the growth of this organization to its present standing.

CLASSIFIED

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

Additional classified advertisements appear in the advertising pages.

POSITION WANTED—Chemical Engineer, age 36, married, 10 years' practical experience, laboratory work; silk weighting; dyeing and finishing; desires connection with reliable concern. Thorough knowledge of cost finding organization and plant layout. Write Box No. 851, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.